DISEASE PREVENTION & HEALTH PROMOTION:

FEDERAL PROGRAMS AND PROSPECTS

REPORT OF
THE DEPARTMENTAL TASK FORCE ON PREVENTION
September 1978

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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PREFACE

In December 1977 a task force composed of representatives of all agencies within the Department of Health, Education, and Welfare was convened to review and analyze departmental activities in disease prevention and health promotion—the first comprehensive review of its sort in the history of the Department. The effort was initiated to identify problems of highest priority and measures to address those problems. This report documents the work of the task force, establishes health status goals, and recommends a set of strategies for the Department to employ in expanding and strengthening disease prevention and health promotion activities. It is in effect a work plan for departmental action to be considered by the Secretary in establishing program priorities. A draft of this report has been reviewed by the chief administrator of each departmental agency, and, where possible, their comments have been incorporated into the report. The report appears in two parts: the first contains the body of the report, and the second contains a series of appendixes, including the inventories of prevention activities found in HEW programs. This task force document is not principally directed to a general audience and is therefore not extensively referenced.

EXECUTIVE SUMMARY

I. INTRODUCTION

This report is premised on the notion that there are many currently available prevention practices which, if vigorously applied, will result in improved health for the American people, and that there are other practices we can consider which, if promising research is pursued, will have similar preventive impact. The report therefore reviews what seems possible, what strategies can be adopted to realize the possibilities, what the Department of Health, Education, and Welfare and other Federal agencies are now doing, and presents recommendations for additional activities addressed to high priority problem areas.

A great deal of thought about the linked concepts of disease prevention and health promotion precedes this report—from the Hippocratic treatises of old to the major prevention advances of the modern era. In the past 5 years, a growing technical and social consensus has emerged in the area of preventive medicine. This consensus has been reflected in a series of important publications—for example, *A New Perspective on the Health of Canadians* (1974), sponsored by the Government of Canada, *Preventive Medicine U.S.A.* (1975), cosponsored by HEW's National Institutes of Health and the American College of Preventive Medicine, and *Perspectives on Disease Prevention and Health Promotion* (1976), an Institute of Medicine document. The President, the Secretary, and the Assistant Secretary for Health and Surgeon General, have strongly endorsed prevention.

The backdrop, then, for this report is the evident challenge and great opportunity available to the Nation and the Department in disease prevention and health promotion. To address the multitude of possible interventions and activities encompassed by the term, prevention, the Department's Prevention Task Force developed an analytic framework targeted at three areas: human lifestyle; human environment; and human services. The three areas all represent influences on health and two represent classes of risk factors which condition individual health status. The choices an individual makes about personal *Lifestyle* can increase risk of health problems in a series of behavioral areas. *Environment* represents settings and sources of external hazard which also increase risk of health problems. The third area, *Services,* represents the preventive services through which the incidence or course of preventable diseases and conditions can be influenced for any individual. A useful aspect of this analytic system is that it quickly differentiates the kind of intervention necessary to prevent disease: health promotion directed at lifestyle enhancement, health protection directed at reducing environmental hazards, and provision of personal preventive health services. The following narrative summarizes, further defines, and illustrates the target areas:

- Lifestyle.—Perhaps the most important category of activities to prevent disease and promote health is also the most difficult category in which to achieve results—the changing of individual lifestyle. There is no question that individual behavior related to smoking, drinking, nutrition, rest and work habits, among others, can have a dramatic effect on the morbidity and mortality of the individual. The Department must increase its efforts to promote health through enhanced lifestyles.
- Environment.—There is clear evidence that environmental factors contribute substantially to disease morbidity and mortality in this country, and many HEW programs are directed at the development of measures to improve the human environment. These efforts include programs to prevent lead poisoning, establish occupational health and safety standards, fluoride water supplies, ensure safe food, drugs, and medical devices, establish health standards for toxic substances released into the environment, and provide environmental sanitation controls.
- Services.—Services designed to prevent disease and promote the health of individuals are provided by HEW routinely to certain population groups, and on a demonstration basis to others. These services include immunizations, genetic disease counseling, family planning, prenatal and postnatal care, and screening for sexually transmitted diseases, hypertension, cancer, and diabetes. Preventive services are delivered in a variety of settings, including Indian reservations, Migrant Health Centers, Community Health and Mental Health Centers, public health clinics, and National Health Service Corps assignee offices. State and local health agencies are also key sources of preventive health services. The Department can promote the availability and use of these services directly by financial support, technical assistance and training, and indirectly by their emphasis on education for health professionals.

The body of the report is designed to flow logically from consideration of the state of the art in prevention, to development of a strategy for further action, to brief analyses of current HEW prevention activities as well as activities in the Federal agencies which may also have prevention objectives. Both of the latter are supported by detailed appendixes. A presentation on decision criteria leads to a final section isolating specific recommendation for strategy implementation—actions keyed to 15 high priority problem areas.

II. STRATEGY TARGETS: HEALTH STATUS GOALS

The report identifies strategy targets in 12 categories of health-related goals, and analyzes each of these targets by defining the problem and reviewing the state of knowledge about prevention. The intent is to present a succinct but thorough review of possible targets for additional HEW prevention activity.

Chronic Disease: Cardiovascular disease is the leading cause of death and of potential years of life lost. A significant reduction in cardiovascular mortality has occurred in recent years, partially attributed by many to such preventive measures as hypertension control, reduction in cigarette smoking, and dietary changes.

Cancer is the second leading cause of death, and of years of life lost. Known or highly suspected causative factors include cigarette smoking, nutrition, environmental and occupational exposures, drugs, radiation, and sunlight. Prevention is based on reduction or removal of carcinogenic agents from the environment and changes in personal habits of individuals or population groups through education. Secondary prevention depends on screening and early identification of cancer victims.

The problem of respiratory disease is multifactorial in nature. Smoking, air pollution, infection, and certain work environments contribute to chronic respiratory disease, of which chronic obstructive pulmonary disease is the most common source of disabling disease. Smoking cessation and control of environmental exposures are the key prevention activities. Screening is of little value other than to identify affected workers who should be moved to other jobs.

Diabetes affects 5 percent of the population. Disease control programs seek to link available services in order to reduce such consequences of uncontrolled disease as hospitalization for diabetes and amputations. Prevention of long-term complications of the disease does not seem feasible at present.

Arthritis is second only to cardiovascular disease as a cause of disability. Although certain screening and health education approaches are employed, for example, training in posture for certain musculoskeletal disease, available knowledge is not complete enough to produce new means of primary prevention.

Neurologic disorders stem from many causes, covering many conditions. Stroke prevention through hypertension control and diet is a high priority prevention activity. Prevention of epilepsy due to head injury through motor vehicle and recreational accident prevention and prevention of epilepsy due to factors of pregnancy and labor through access to good prenatal and infant care, are important prevention techniques. Genetic counseling can help prevent certain heritable disorders but a majority of neurologic disease is not yet preventable.

Communicable Disease: Vaccine-preventable diseases of childhood have been significantly reduced by immunization, but maintenance of high levels of immunity requires continued public health attention. Influenza/pneumonia is the only remaining infectious disease category among the 10 leading causes of death. Routine annual flu immunizations of persons at high risk—primarily those with chronic debilitating disease—would prevent excess mortality among those groups.

Sexually transmitted disease remains an important problem. Control is based on interruption of disease transmission through sexual partner referral, screening and quality clinical services, and education. Hospital-acquired infections are a major source of increased illness and increased length of stay for inpatients. Infection control programs can significantly lower hospital infection rates.

Traumatic Injuries: Accidents and other violent sources of injury and death account for a significant proportion of life years lost, because victims are often young people. Many accidents are preventable. Work place safety procedures and protective devices, as well as worker education, are important prevention approaches. Injury control in home and recreational settings can prevent many accidents—such as guards on windows where falls are a problem. Similarly, aspirin poisonings of children dropped dramatically when child-proof caps, a simple environmental measure, were adopted.

Motor vehicle accidents are a special case. Highway and automobile safety measures, on the environmental side, and seatbelt use and reduced driving speed, on the behavioral side, will contribute to reductions in accidental injury and death. Secondary prevention of traumatic mortality is based on systematic, rapid emergency medical services.

Mental Retardation and Congenital Defects: As acute illness among children has declined, chronic handicapping conditions among children who survived serious prenatal, birth related, and/or postnatal insult or deprivation, have emerged as a problem. Three percent of the general population could be classified as mentally retarded at some point in their lives. Congenital defects may result from environmental insult or genetic disease. A significant and detectable malformation occurs in 24 of every 1,000 births. Prevention of mental retardation and congenital defects can include rubella immunization, genetic counseling, good prenatal care, adequate maternal nutrition and avoidance of cigarette, alcohol, and drugs, avoidance of radiation and chemical exposures, education of parents and providers about these risk factors, and prenatal and newborn screening for a variety of treatable defects. Modification of factors associated with the socioeconomic environment can be a form of primary or secondary prevention.

Pregnancy and the Neonatal Period: The infant mortality rate in the United States has been declining steadily during the past 25 years, but the disparity by race has persisted. Childbearing in early adolescence and after age 35 produces higher risk. Women who seek prenatal care experience fewer premature births and neonatal deaths, but approximately 1 of every 10 women giving birth in the United States has had little or no prenatal care. Low-birth-weight infants are at high risk; maternal nutrition, smoking, and alcohol use have been associated with this risk factor. Avoidance of unwanted pregnancy by safe and effective contraception is an important preventive health service.

Dental Disease: Dental caries are a prevalent public health problem. Almost 90 percent of children aged 12–17 have at least one decayed, missing, or filled tooth, and more than 20 percent have 10 or more such teeth. Periodontal or gum disease, a major cause of tooth loss among adults, usually begins during childhood. Over half of all adults 65 years of age or older have lost all of their natural teeth.

A prevention program for childhood dental health would center on expansion of community and school water fluoridation. Other preventive dental services would include fluoride rinses and adhesive sealants, as well as health education aimed at brushing and flossing and reduced sugar intake. Dental treatment should be available to arrest problems, particularly in schools were fluoridated water is unavailable.

Vision and Hearing: Retinal vascular disease, largely resulting from diabetes, cataracts, and glaucoma, is a leading cause of blindness in the United States. Refractive error is highly prevalent; screening and corrective lenses in schoolchildren will help avert impairment of school performance and safety.

Strabismus, if undetected in childhood, may subsequently lead to amblyopia, visual deterioration in one eye. Screening earlier than school entry is essential to prevent blindness. Vision loss due to accidental injury is preventable by use of safety glasses in industry and home workshop settings.

Noise-induced hearing loss is readily preventable in work and recreation. Secondary prevention depends on detection of early hearing loss and protection from further exposure. Hearing loss from chronic otitis media in certain high-risk groups may be preventable by prophylactic antibiotic use.

Emotional Disorders: Although case definition is difficult, types of mental disorders have been associated with social class, sex, and urban or rural place of residence. In general, the highest rates of psychiatric disorders have been found among people with the lowest levels of income, education, or occupation. Primary prevention activities in the mental health field are focused on preventing needless emotional distress in situational life crises such as death, divorce, marital separation, and retirement, and promoting individual, family and community strengths which are related to sound mental health. Additional research, especially epidemiologic studies of specific subpopulations which may be at high risk, will help. Application of existing knowledge, however, can lead to new forms of outreach, new educational approaches, and more responsive community mental health services.

Alcohol and Drug Abuse: In the United States there are an estimated 10 million problem drinkers, of whom 6 million may be alcoholics. Drug abuse covers a wide variety of narcotic drugs, as well as extensive uses of prescription sedatives, tranquilizers, and stimulants for nonmedical purposes.

Primary prevention of alcoholism depends primarily on education, with prevention of fetal alcohol syndrome (FAS) as a special focus. Prevention of drug abuse requires strategies designed for risk groups. Information and education, and providing alternatives to compete with the appeal of drug use, are elements of most drug abuse prevention strategies.

Enhanced Development of Children and Adolescents: Accidental death and problems of sexuality and fertility are important aspects of health and development. The socioeconomic environment is also a critical factor. This section of the paper singles out four aspects of development for special attention: learning disabilities; Sudden Infant Death Syndrome; family development; and reduced incidence of unwanted pregnancy.

Enhanced General Physical and Emotional Well-Being: The single most important contributor to enhanced physical and mental well-being is probably improved socioeconomic status. There are, however, a number of key health-related variables which deserve emphasis:

(1) Nutrition. Nutrition is an important aspect of healthful behavior, and the characteristics of foods available in the diet are modifiable environmental factors. The key United States nutrition problem is overnutrition and obesity rather than nutritional deficiencies, with the exception of the overdiagnosed iron-deficiency anemia. Prudent dietary practices for prevention include reduction of excess calories, moderate intake of fat, cholesterol, and sugar, prudent reduction in salt intake, and increased use of complex carbohydrates and non-red-meat proteins.

(2) Unwanted fertility/family planning. Family size, spacing of births, and age of parents have important bearing on well-being. Access to high-quality fertility and contraceptive services with improved outreach and good educational and counseling programs is a vital part of a disease prevention and health promotion strategy.

(3) Exercise. Physical fitness is strongly related to well-being, and is an important adjunct to weight control. Fitness programs are readily incorporated in wellness and employee health programs. School physical education programs can be an important source of information and education about physical fitness activities. Community facilities, with qualified exercise leaders, can help reduce social barriers to fitness.

III. STRATEGIES FOR ACTION

This section presents a comphensive review of strategy elements and implementation actions for obtaining improved levels of the strategy targets in section II. It considers possible measures which may be taken, the settings important for their delivery, the private sector's responsibility, and Federal and non-Federal public sector responsibility for implementation including support for knowledge development activities. Priorities for HEW action are developed in a later section on recommendations.

The activities noted as essential strategy elements can be grouped in three basic categories:

- Health promotion directed at population groups
- Health protection directed at population groups
- Personal preventive health services

The first of these is the most recent and least developed avenue of prevention. Many health promotion activities are still in a demonstration stage. Although a number of wellness and lifestyle programs are underway in and outside of the Department, major advances in this area will probably require a better understanding of risk and behavior, as well as intervention measures. Twelve categories of behavior may be identified as important determinants of health status:

(1) Smoking
(2) Nutrition
(3) Alcohol use
(4) Habituating drug use
(5) Driving
(6) Exercise
(7) Human sexuality/contraceptive use
(8) Family development
(9) Risk management
(10) Stress management
(11) Coping/adaptation
(12) Enhanced self-esteem

Measures designed to assist individual efforts to improve behavior in these categories could lead to substantial reductions in morbidity and mortality, if effective.

Health protection directed at population groups is the lineal descendent of the public health activities which were the traditional base of prevention activities a century ago. Regulation and enforcement, voluntary adherence to standards, infectious disease control, and surveillance and monitoring activities are examples of prevention activities in this group. Reduction of exposure to a number of sources of hazards is the target of these activities. Such exposure sources include hazards related to air, water, food, drugs, motor vehicles, firearms, and other physical hazards. Regulatory authority over most of these areas lies outside the Department, but HEW's research capabilities can be employed to facilitate the work of the responsible agencies.

Personal preventive health services take in the extensive array of procedures and services provided to the individual by medical providers and other practitioners which are designed to prevent disease or arrest its development. Such services as immunization, screening tests, chemoprophylaxis, and contraception are included here, as are targeted health education, patient education, and counseling. Services specific to 10 age groups are identified in the appendixes; particularly important are those delivered to pregnant women and children.

To implement prevention strategies effectively, it is essential to develop cross-cutting activities targeted to, and tailored for, different settings, including schools, the worksite, the home (with television and radio), the medical treatment setting, and the community. Major responsibility for implementing these strategies must remain with the private sector. Voluntary agencies with a wide variety of objectives and clients provide useful channels for prevention activity at the community level; these agencies are commonly involved in screening, health education, referrals, and sometimes in service delivery as well.

Labor unions and industry have important stakes in the health of workers and their families. They have an obvious involvement in occupational safety and health, but also should encourage health promotion programs for employee groups. Likewise, insurers have a strong interest in better safety practices and improved health and longevity. This interest has been expressed in health education materials and technical assistance provided for covered industries. Greater use of incentives, such as life and health insurance premium reduction for groups who practice prudent personal health behavior, and coverage of key preventive health services in health insurance plans, could be useful.

The communications industry, especially broadcasting, has a significant impact on health promotion success. Broadcasting is a vehicle for a multitude of messages, both commercial and programmatic, and the industry can influence program content and counterbalance commercial messages in areas such as violence, responsible sexuality, and reliance on drugs and alcohol.

But the Federal Government also has an important role in developing certain strategy elements. The key elements are the delivery of preventive services to certain population groups, the strengthening of non-Federal capabilities in prevention, the establishment and enforcement of certain health and safety standards, the assurance of adequate manpower for prevention, the provision of leadership and coordination for prevention, and the expansion of research and data collection for prevention.

IV. CURRENT HEW ACTIVITIES AND GAPS

Three Prevention Task Force work groups were assembled to develop an analytic framework and apply it to inventories of HEW programs and activities. This section summarizes their analyses, with more detailed discussion and tabular findings presented as appendixes.

The inventories included estimates for Public Health Service (PHS) and some Health Care Financing Administration (HCFA) prevention expenditures. In addition, there are areas such as preventive health services reimbursed by HCFA, services and lifestyle activities of the Office of Human Development Services (OHDS), and lifestyle activities of the Office of Education (OE), in which substantial but undetermined prevention resources are expended. The total identifiable HEW expenditures for prevention were approximately $1.8 billion in 1977, but this sum does not include large amounts expended in HCFA, OHDS, and OE programs for activities which are preventive in nature, though not specifically identified as such.

The work group on lifestyles identified personal behaviors and practices which influence health status within the strategy targets of section II, and analyzed the activities of PHS, OHDS, and OE which are focused on health information, education, and promotion. The 12 key behaviors noted earlier were identified in this process. Each of these health-related behaviors is analyzed in terms of specific agency efforts which address that behavior, and apparent gaps in the HEW effort. In addition, there is a brief summary of gaps with respect to the strategy targets.

With regard to health protection activities, HEW has numerous environmental programs, but there are a number of areas requiring further research or initial investigation. Environmental research needs are identified for respiratory diseases, carcinogenesis, mutagenesis, and teratogenesis, and cardiovascular disease. In addition, analysis of problems of the community reveals both program and knowledge gaps. The occupational setting is assessed as a major environmental focus for prevention.

Professional training and manpower needs are discussed, with particular emphasis on occupational specialists and on scare disciplines such as epidemiology and environmental science. Data needs for prevention in the environmental area are singled out as a significant gap in current efforts.

Personal preventive health services account for the largest expenditure of HEW funds for prevention. The majority of HEW service programs are aimed at special groups—the poor, the aged or very young, and the medically underserved. This section gives brief summaries of current HEW activities by agency, with detailed inventories in the appendixes. In addition, activities and programs are discussed in terms of their health status objectives, using the 12 strategy targets of section II.

V. FEDERAL PREVENTION ACTIVITIES OUTSIDE HEW

There are a large variety of activities in other Federal agencies that either contribute to disease prevention and health promotion or indirectly have prevention impacts. Indeed, in some ways most preventive responsibilities lie outside HEW. Examples include highway traffic safety (DOT), nutritional activities (USDA), occupational and mine safety regulations (DOL), and environmental protection (EPA). A surprising number of agencies have programs potentially or actually carrying out prevention activities. In addition to the discussion in this section, an appendix presents a more detailed catalog slightly revised from a report prepared for the Prevention Task Force by the Health Policy Program at the University of California at San Francisco.

VI. CRITERIA FOR SETTING PREVENTION PRIORITIES

While all the activities identified in the Task Force Report are important, they obviously do not all have equal merit. For example, if effective approaches were developed to encourage positive changes in just 5 behavioral factors (smoking, nutrition, exercise, alcohol consumption, and patient adherence to antihypertensive medication), the incidence of 7 of the 10 leading causes of mortality in this country could be substantially reduced (heart disease, cancer, stroke, diabetes, traffic accidents, cirrhosis of the liver, and arteriosclerosis). Areas identified as high priority for departmental action should be: (1) predominant factors in disability or death; (2) amenable to intervention; (3) currently supported at inadequate levels, hence most likely to yield significant benefits at the margin; and (4) prominent societal concerns.

VII. RECOMMENDATIONS

The Department has already begun to move forcefully to give new emphasis to many of the problems in prevention. Major initiatives have been launched in childhood immunization, smoking and health, and teenage pregnancy. Similar emphasis is needed for nutrition, alcohol abuse, and environmental toxicology. Particularly important are: ensuring preventive services in departmental direct services delivery programs, and shifting to a greater emphasis on prevention research in departmental research programs. In each of these efforts, children and pregnant women should comprise the primary target groups.

But in addition to major needs just noted, there are a number of additional activities in other problem areas which meet the criteria discussed in section VI. Specific recommendations are noted for departmental action in the 15 problem areas listed below:

- Smoking and health
- Nutrition
- Alcohol abuse
- Exercise and fitness
- Hypertension
- Child health
- Adolescent pregnancy
- Environmental toxicology
- Occupational health
- Dental diseases
- Drug abuse
- Hospital infections
- Sexually transmitted diseases
- Accidents
- Mental health

These problem-specific recommendations are regrouped by strategy element to conform more precisely to departmental lines of programmatic responsibility, and to accommodate certain cross-cutting activities which may provide support for work in several problem areas. Proposals include:

(1) Federal support for personal preventive health services through health insurance, as well as in departmental direct service delivery programs;

(2) efforts to strengthen the prevention capabilities of State and local health and education agencies, health planning agencies and HMO's through both project and formula grants for carefully planned programs directed at high priority problems;

(3) more comprehensive authority to determine and enforce health and safety standards with respect to food and alcohol, better tailoring of research programs to regulatory needs in environmental and occupational health, and provision of a mechanism to ensure a prior HEW review of health-related decisions of the regulatory agencies;

(4) expanding the supply of prevention manpower in such key categories as epidemiology and environmental toxicology;

(5) provision of economic incentives for the delivery of preventive services through CHAP and HMO's;

(6) giving leadership to prevention activities through measures such as the issuance of a Surgeon General's Report on Prevention, the establishment of a Prevention Roundtable to coordinate Federal prevention efforts, and the initiation of a National Health Promotion Program; and

(7) expansion of the prevention knowledge base through community-based risk-reduction demonstration programs, the establishment of long-term prospective epidemiologic popula-

tion studies, and studies on the childhood determinants of behavior, as well as a number of studies specific to the problems noted above.

The range of activities reviewed in this report is tremendously broad and will require substantial resources, but the importance of supporting stronger efforts in disease prevention and health promotion cannot be underplayed. Chronic diseases, which drain so many of the Nation's health care dollars, need not be hallmarks of the aging process. Disease treatment has provided the major focus for the activity of both the public and private health establishment, at tremendous cost and with surprisingly little gain in the public's health. Substantial uncertainties exist on ways to prevent disease, but more is being learned daily. A strong national commitment to disease prevention and health promotion is needed to ensure that Americans will be a truly healthy people.

I. INTRODUCTION

Many of the major chronic diseases in America are preventable. Indeed, many are preventable by actions well within the control of each individual. This notion, coupled with a history of success in controlling communicable diseases, holds that there are many currently available prevention practices which, if vigorously applied, will result in improved health for the American people. Some will show visible results almost immediately, such as reduced measles incidence following a national immunization effort; others will become visible over a decade or even a generation, as in reduced cancer incidence from smoking cessation or in increased longevity from healthier workplaces. There are other practices we can consider which, if proven effective, could have similar preventive impact; for some, promising research pursued to conclusion could shortly permit us to begin them.

The intent of this report is to review what seems possible, what the Department and other Federal agencies are now doing, and what strategy we can follow to strengthen and expand the application of disease prevention and health promotion in the United States. Several actions on which the Department has recently embarked make an important contribution to the strategy. Several others, also promising, warrant similar positive action.

Doing more in prevention will require willingness to act on less than complete data and less than perfect knowledge, but knowledge that now is significantly better than even a few years ago. It will require willingness to use aggressively the capacities of governance because the forces arrayed against healthful behavior and safe environment are powerful. Leadership from the White House, the Department, the Congress and the State Houses and City Hall is certainly needed. Finally, it will require willingness not to turn back from the goal of promoting healthy people.

A. BACKGROUND

The linked concepts of disease prevention and health promotion are far from novel. Health and disease have preoccupied man from the earliest records of human pursuits. Ancient Chinese texts identified ways of life by which one could maintain good health—the doctrine of *yin* and *yang,* for example. In Classical Greece, the followers of the gods of medicine associated healing arts not only with the god, Aesculapius, but with his two daughters, Panacea and Hygeia. While Panacea was involved with medication for the sick, her sister, Hygeia, was concerned with living wisely and preserving health. Later, in Rome, health of the populace was a principal concern in Roman Law; *sanitas publica suprema lex.*

The Hippocratic writings contain relevant passages for today's health problems, in their astute recognition of the role of environment and the ways of life in occurrence of disease. Rene Dubos observes, for example:

> The view that the environment plays an important role in the problems of human biology, medicine, and sociology has never been stated with greater breadth and clarity than it was at the dawn of science in the Hippocratic treatises, *Air, Waters, and Places* (*1*).

In the modern era, there have been periodic surges of interest leading to major advances in prevention. The sanitary reforms of the latter decades of the 19th century and the introduction of antibiotics and effective vaccines in the middle part of the 20th century are two examples. It appears that the 1970's present an opportunity on a similar scale, and recent writings reflect the renewal of interest.

In 1974, for example, Canada offered a succinct restatement of Hippocratic ideas of prevention in the publication, *A New Perspective on the Health of Canadians.* This document brought into sharp focus, by reference to four health fields (human biology, environment, lifestyle, and health care organization), the modest gains in health status attributable to medical care compared to the potential gains from changes in environmental or lifestyle influences on health (*2*).

In 1975, the Fogarty International Center of the National Institutes of Health (NIH) and the American College of Preventive Medicine cosponsored a National Conference on Prevention. While not necessarily the primary purpose of the conference, the proceedings, published as *Preventive Medicine U.S.A.*, have been viewed by many as evidence that there now exists in the field a technical consensus which had not existed one or two decades ago (*3*). At the same time, there is a growing social consensus around the need for, and the value of, disease prevention and health promotion (*4*). The President, the Secretary of HEW, and the Assistant Secretary for Health, have made strong public endorsements of prevention, and a rapidly growing interest has emerged in the U.S. Congress. The Federal interest is paralleled by great interest in the State health agencies (*5*).

Pages of charts and tables could be cited to illustrate the problems of disease and health today and the contribution prevention could make to their resolution. Two examples will be sufficient to illustrate the points:

- A child born in 1900 could expect to live 47.3 years, on average; a child born in 1974 had a life expectancy of 71.9 years. The difference, 24.6 years (nearly a quarter century), is attributable to remarkable decline in infant and childhood mortality—in a large measure a result of infectious disease control, immunizations, environmental sanitation, and similar preventive actions. The science and technology of 20th century medicine, while avidly sought when illness comes, has evidently added little to adult longevity. A 45-year-old man in 1974, compared to his counter-part in 1900, could expect to live only 3 years longer (*6*). The road to better health is not paved with more and more medicine.

- Belloc and Breslow have nicely quantified what Hippocrates and most grandmothers have long known; prudent living extends one's life. A 45-year-old man can add 11 years to his life by improving simple and basic living habits, having to do with smoking, weight control, alcohol consumption, hours of sleep, regularity in meals and good nutrition, and physical activity (*7*).

The backdrop, then, for this report is the evident challenge and great opportunity available to the Nation and the Department of Health, Education, and Welfare in the area of disease prevention and health promotion. Prevention is an enormous subject. It extends from the interface of preventive medicine with clinical practices (a nonexistent boundary in some disciplines such as pediatrics and family medicine) on one hand, to actions such as air pollution control and highway safety on the other. Obviously, only a portion of prevention—perhaps a small portion—requires a health professional and a health care setting. Yet, the human health outcome associated with these disparate actions entail a health-oriented strategy.

To address the multitude of possible interventions and activities encompassed by the term, prevention, the Department's Prevention Task Force developed an analytic framework targeted at three areas: human environment, human lifestyles, and human services. The agencies with missions which contribute to prevention were requested to inventory their prevention activities, and the budget resources allocated to them against these three target areas. Work Groups were formed to analyze these inventories for gaps, and begin to address possible strategies. The Institute of Medicine (IOM) of the National Academy of Sciences (NAS) then convened, under contract with the Public Health Service (PHS), a Conference on Prevention (February 16–18, 1978), with a small group of participants with expertise in one or more of the three target areas. The participants were asked to review and discuss a staff paper prepared by the IOM (*8*) and Preliminary Working Papers prepared by the Prevention Task Force Work Groups. Subsequent to the Conference, the inventories were revised, and this report was developed.

Thus, the strategy reflects input and ideas for several sources: the inventories of current Department efforts; meetings with each of the PHS agency heads and their staff to solicit views and exchange ideas; the expertise of the Prevention Task Force participants; the views of consultants and representatives of groups with prevention interests with whom the Task Force was discussed; the views of other persons within the Department; the IOM Conference discussion; a summary paper prepared by the IOM; and selected documents prepared under departmental auspices in the course of the effort.

B. CONCEPTUAL FRAMEWORK

Inevitably, a reductionist approach to analysis creates the danger of severing, or at least rendering indistinct, important linkages between elements of a proposed framework for analysis. Yet, prevention takes in such a varied and large terrain, it seems essential to divide it into manageable analytic units. Thus, the inventories, the work groups, and the 3 days of the IOM Conference were deliberately organized around three target areas of prevention: lifestyle, environment, and services. While this scheme, in the nature of things, required some "force fits" to accommodate the variety of prevention actions, it also brought a logic to the analysis which was conceptually robust.

The three areas all represent influences on health. Two represent classes of risk factors which condition individual health status. That is, *Lifestyle,* or health-related behavior, is a determinant of a person's health status—the choices she or he makes of personal lifestyles can increase risk of health problems in a series of behavioral areas. *Environment* represents sources of external hazard which also increase risk of health problems, as well as the setting in which positive efforts can be deployed to protect health. The third area, *Services,* represents the individual and population-directed services through which we can influence the incidence or course of preventable diseases and conditions. A useful aspect of this analytic system is that it quickly differentiates the kind of intervention necessary to prevent disease. The following narrative summarizes, further defines, and illustrates the target areas:

- Lifestyles—Perhaps the most important category of activities to prevent disease and promote health is also the most difficult category in which to achieve results—the changing of individual lifestyle. There is no question that individual behavior related to smoking, drinking, nutrition, rest and work habits, among others, can have a dramatic effect on the morbidity and mortality of the individual. The Department must increase its efforts to affect lifestyle. There is precedent for governmental policy urging such changes in behavior. For example, at the turn of the century, major programs directed at better hygenic practices, many of which required important changes in personal behavior, led to substantial improvement in health. In many ways, the behavior changes required at this point are less dramatic than the earlier ones.
- Environment.—There is clear evidence that environmental factors provide a major contribution to disease morbidity and mortality in this country, and many HEW programs are directed at the development of measures to improve the human environment. These efforts include programs to prevent lead poisoning, establish occupational health and safety standards, fluoridate water supplies, ensure safe food, drugs, and medical devices, establish health standards for toxic substances released into the environment, improve vehicular and highway safety, and provide environmental sanitation controls.
- Services.—Services designed to prevent disease and promote the health of individuals are provided by HEW routinely to certain population groups, and on a demonstration basis to others. These services include immunizations, genetic disease counseling, family

planning, prenatal and postnatal care, and screening for sexually transmitted diseases, hypertension, cancer and diabetes. Preventive services are delivered in a variety of settings, including Indian reservations, Migrant Health Centers, Community Health Centers, public health clinics, and National Health Service Corps assignee offices. State and local health agencies are key sources of preventive health services, especially those organized on a community-wide basis. PHS activities can promote the availability and use of these services directly by financial support, technical assistance and training, and indirectly by their emphasis in education for health professionals.

C. DEFINING PREVENTION

A precise definition of prevention can be elusive. Traditionally, for example, prevention has been subdivided into primary, secondary, and tertiary prevention. In this classic formulation, primary prevention is defined as those activities undertaken to prevent the occurrence of disease or illness, secondary prevention is defined as those activities undertaken to intervene after disease can be detected but before it is symptomatic, and tertiary prevention is defined as those activities undertaken to prevent the progression of symptomatic disease or illness. This approach is based on the natural history of disease, and thus tends to be most understandable in the context of a physician practicing preventive medicine. Leavell and Clark (*9*) differentiate two categories of secondary prevention: (1) early diagnosis and prompt screening, which universally is accepted as preventive in outcome and intent, and (2) disability limitation, or adequate treatment to arrest disease, stop further complications, and avert death, which, some observers believe, may be preventive in outcome but which is in practical terms indistinguishable from mainstream practice of clinical medicine.

In the Services work group, occasionally vigorous discussion was engaged as the work group members tried to clarify the interface between secondary prevention—that portion of Leavell and Clark's definition which emphasizes early intervention—and medical care. The same discussion occurred on the first day of the IOM Conference. The net effect is that some reasonable compromise has to be reached; the Services inventory represents such a compromise.

The ultimate definition of the outcome of prevention—i.e., health—is that cited in the charter of the World Health Organization (WHO): "A state of complete physical, mental and social well-being and not merely the absence of disease and infirmity." While some argue that it is an excessively idealistic definition—for in fact, under this definition, we are all sick (*10*)—others have seen it as a challenge to develop operational definitions of wellness which have utility for assessing program impacts (*11*). The strategy presented in this report recommends further action which balances the twin focuses, health promotion, and disease prevention, a strategy intentionally aligned with the WHO ideal.

D. FORMAT OF THE REPORT

The body of the report is designed to flow logically from the state of the art in prevention, to a review of a strategy for further action illustrated by a catalog of possible actions, to what HEW and other agencies are currently doing as well as apparent gaps in what we are doing, to criteria for establishing program priorities, to recommendations for those actions which seem most promising to strengthen HEW's program. In addition, the report discusses the data needs which the prevention strategy engenders, and the applicability and findings of cost-benefit analyses in prevention. Detailed appendixes add supporting documentation—for example, tabular presentation of agency inventories.

The following section, Health Status Goals, assesses in some detail the present knowledge about what can be done in prevention and what areas of research we can pursue which will add to that knowledge. It is structured against 12 health status and well-being goals, developed within the context of Goals 1 and 2 from the National Health Planning Guidelines.

Section III, Strategies for Action, has several purposes. The first is to review in some detail the health promotion measures important to improving lifestyle, the health protection measures important to improving our environment, and the key personal preventive health services. Secondly, notation is made of the important settings in which these measures are to be implemented. Finally, the Federal responsibility for disease prevention and health promotion is reviewed in some detail.

Section IV summarizes the inventories of HEW activities and reviews the efforts underway within the Department to support the identified strategies, as well as identifying the gaps in those efforts. The discussion follows the lifestyle (health promotion), environment (health protection), and personal preventive health services format. Section V then discusses the impressive responsibilities for disease prevention and health promotion which lie in 10 departments and 17 agencies outside HEW.

Section VI reviews the indicators used to assess the relative magnitude of the targeted health problems, and discusses some of the criteria which may be used to set priorities and develop recommendations. The prevention arena is vast, and some discrete concepts are needed to facilitate the efforts to target.

The Recommendations section singles out the most promising packages of these actions for special consideration.

There is frequent overlap in the discussions of the various sections. An example is the discussion of nutrition in section II (K & L), section III, and the Recommendations. While not optimal, the overlap has been tolerated by the editors in the interest of allowing the sections to stand on their own—and it is hoped that the reader will not find this inconvenient.

E. CONCLUSION

In the course of this Task Force, some general principles emerged which, while embodied throughout the report, warrant highlighting here.

- The highest impact from prevention is likely to occur where it can be selectively directed to known high-risk targets. Infants and pregnant women are obvious targets. If this Nation merely did all we know how to do to promote good health in the first 2 years of life—and nothing else—the gains would be dramatic. The poor, especially minorities, would be best served by prevention. Black infants have a mortality rate nearly double that of whites; Black adults have age-adjusted death rates 33 percent (males) and 45 percent (females) higher than white adults. Homicide is the second leading cause of years of potential life lost (years between death and age 75) for nonwhite males, exceeding even cancer. For nonwhite male youths aged 15–24, homicide is the *leading* cause of death and occurs at a rate which is nearly 10 times that for white males of the same age. For homicide, we have no dramatic intervention to propose, save gun control; for others, such as hypertension (where the prevalence among blacks of severe hypertension is nearly triple that among whites, and exceeds 10 percent of adults), intervention is readily available.
- In addition to population targets, there are a number of targets which emerge as particularly important. As noted in section VI, 7 of the 10 leading causes of death in the United States (heart disease, cancer, stroke, motor vehicle accidents, diabetes, cirrhosis of the liver, and arteriosclerosis) could be significantly reduced if effective measures could be identified to change the habits of vulnerable Americans with respect to just five behaviors—smoking, alcohol abuse, nutrition, exercise, and adherence to antihypertensive medication.
- The Department currently carries out a wide variety of prevention missions. While the Prevention Task Force focused on gaps, it is important to assure that we maintain as well as possible the disease prevention and health promotion programs already in place. Maintenance of a quality effort in ongoing prevention activities is no less important than the more glamorous new programs we may elect to initiate, and should not be neglected in competing claims on resources or management attention.
- The State and local health agencies are key partners with HEW in carrying out a prevention strategy. They have statutory responsibility, a sturdy tradition, and expertise in the field. As a $5 billion element of the national health system, they provide the essential infrastructure on which to base a prevention strategy, but continue to require HEW's technical resources and support to build capacity for chronic disease control.
- A number of specific interventions have been analyzed on the basis of costs and benefits, and confirmed by these studies as economically sound investments.[1] This report suggests selective use of this technique in other prevention areas should be made. However, the Task Force, in company with a number of commenters at the IOM Conference and in the HEW agencies, *does*

not argue that we should do more prevention because it will save money. In fact, a great many prevention activities are likely to return their cost; but the evidence does not exist for the generic claim. Indeed, at the outset, at least, society will need to continue to spend what it spends on acute medical care needs and to add new expenditures for prevention. Ultimately, healthy people, happy and productive, should be ample justification for new initiatives in prevention.

- Without in any way assuming a defensive posture, we must be careful not to oversell prevention. Just as it now is obvious that the bulk of high-technology medicine adds little to health, as WHO defines it, it is also fair to say that a fuller application of available preventive techniques will not completely or immediately make dramatic changes in health status. We must even recognize that HEW alone cannot do all that can be done—highway safety, effective gun control, environmental protection, better housing—are all responsibilities of sister departments in which we may encourage them but on which we cannot ourselves take action. Finally, we must recognize that there are broad social goals which will affect what we are able to accomplish. It seems probable that progress in equal opportunity, educational attainment, certainly in jobs for all who wish to work, will greatly aid our effort. These are outside the scope of new efforts in prevention, but are a social context within which they must operate.

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[1] This was anticipated early in the Nation's history by Ben Franklin, from whose proverbs we may infer benefit: cost ratios ranging from 9:1 to 16:1: "A stitch in time saves nine"; "An ounce of prevention is worth a pound of cure."

II. STRATEGY TARGETS: HEALTH STATUS GOALS

The goal of any prevention strategy is reduced disease and improved health. Section II discusses the principal health problems which are targeted by the Department's prevention strategies and notes the kinds of measures which may be considered in the effort. Twelve health status goals are identified for discussion:

A. Reduced incidence of chronic diseases
   (1) Cardiovascular
   (2) Cancer
   (3) Respiratory
   (4) Diabetes Mellitus
   (5) Arthritis
   (6) Neurological
   (7) Other
B. Reduced incidence of communicable diseases
C. Reduced incidence of traumatic injuries and deaths (homicide, poisoning, motor vehicle accidents, etc.)
D. Reduced incidence of mental retardation and congenital defects
E. Reduced incidence of morbidity and mortality associated with pregnancy and the neonatal period
F. Reduced incidence of dental disease
G. Reduced incidence of diseases related to vision and hearing
H. Reduced incidence of emotional disorders
I. Reduced incidence of alcohol and drug abuse
J. Enhanced development of children and adolescents
K. Enhanced general physical well-being
L. Enhanced general emotional well-being

These goals were developed within the context of Goals 1 and 2 from the National Health Planning Guidelines developed by the Health Resources Administration under Section 1501 of P.L. 93-641, The National Health Planning and Resources Development Act. The Guidelines are intended to guide the planning of the Health Systems Agencies and also to serve as a statement of national health planning policy. Prevention is prominently involved in Goal 1, which addresses health status, and is the specific focus of Goal 2. The delivery of preventive health services is implicitly a part of Goal 3, which addresses access to health services. The strategy targets in some cases further divide and/or recombine the planning goals to reflect the design of specific interventions. Noted below are the subgoals from the National Health Planning Guidelines matched with the strategy targets developed by the Prevention Task Force (in italics).

1.A. The infant mortality rate should be less than 12 per 1,000 live births for the Nation and less than 18 per 1,000 live births for any health service area or population group.

  E. Reduced incidence of morbidity and mortality associated with pregnancy and the neonatal period

1.B. Deaths from preventable communicable diseases should be less than 12 per 100,000 persons for the Nation, for any health service area or any population group; diseases and deaths preventable by vaccine should be reduced to zero.

  B. Reduced incidence of communicable diseases
  J. Enhanced development of children and adolescents

1.C. Illness and death from preventable noncommunicable diseases and conditions should be reduced in local health service areas to the lowest achievable rates.

  A. Reduced incidence of chronic diseases
  D. Reduced incidence of mental retardation and congenital defects
  G. Reduced incidence of diseases related to vision and hearing
  J. Enhanced development of children and adolescents

1.D. Deaths from accidents and violence should be less than 60 per 100,000 persons for the Nation.

  C. Reduced incidence of traumatic injuries and deaths

1.E.a. An increasing portion of mentally ill patients should be restored to productive living by (a) reducing average length of stay in mental hospitals to less than 25 days; (b) reducing admission rate to mental hospitals to less than 173/100,000; (c) reducing the number of resident patients in mental hospitals to less than 82/100,000; (d) increasing by at least 10% the number of patient care episodes in day care, sheltered housing and other alternative community care facilities.

  H. Reduced incidence of emotional disorders
  K–L. Enhanced general physical and emotional well-being

1.E.b. The incidence and prevalence of alcoholism and related disabilities and deaths should be reduced by at least 5%.

  I. Reduced incidence of alcohol and drug abuse

1.E.c. The number of drug users should be reduced by (a) reducing by at least 15% the frequent use of alcohol and marijuana among 12- to 17-year-olds, (b) interrupting and reversing the trend of increased incidence of marijuana, cocaine, and phencyclidine (PCP) abuse, and (c) reducing by at least 20% the use of barbiturates and other potentially harmful sedatives used for the treatment of insomnia.

  I. Reduced incidence of alcohol and drug abuse

1.F. An increasing portion of persons with chronic disabilities should be enabled to function to their fullest capabilities.
A. Reduced incidence of chronic diseases
K–L. Enhanced general physical and emotional well-being

1.G. Oral health should be improved so that at least 85% of persons 17 years of age retain all of their permanent teeth and at least 80% of persons 55–64 years of age retain some natural teeth.
F. Reduced incidence of dental disease

2.A. Individuals should have enhanced capabilities to make informed choices about styles of living and health practices that maximize well-being and minimize risks of avoidable disease, disability, stress, and premature death.
J. Enhanced development of children and adolescents
K. Enhanced general physical well-being
L. Enhanced general emotional well-being

2.B. Environmental, occupational, and product hazards should be minimized and eliminated when practicable.
(Same as Sub-goal 2.A.)

2.C. Preventive health services should be strengthened as an integral and important part of community and personal health services.
(Same as Sub-goal 2.A.)

2.D. At least 90% of all children under 15 years of age, and all newborns at the earliest appropriate time, should be immunized for polio, measles, rubella, diphtheria, mumps, pertussis, and tetanus, which are preventable by vaccine.
B. Reduced incidence of communicable diseases
J. Enhanced development of children and adolescents
K. Enhanced general physical well-being
L. Enhanced general emotional well-being

The magnitude of the health problem associated with each of the Strategy Targets is described below with a discussion of the state of knowledge about prevention of the disease.

A. REDUCED INCIDENCE OF CHRONIC DISEASE

1. Cardiovascular Disease

a. Problem Definition

Heart and blood vessel disease is the leading cause of death in the United States, killing 998,000 persons in 1976, for a rate of 465 per 100,000 population. These deaths accounted for 52 percent of all deaths in 1976. More specifically, the subset of cardiovascular disease known as "diseases of the heart" caused 723,878 deaths. Diseases of the heart are also the leading cause of potential years of life lost [1]—4,471,254 years lost to premature death. Because heart disease deaths occur at later ages than deaths from some other causes (e.g., accidents), heart disease accounts for 23.8 percent of life-years lost, compared to 38.8 percent of all deaths.

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[1] Throughout this report, "potential years of life lost" means years between age of actual death and expected lifespan to age 75.

In about one-quarter of patients with coronary heart disease, the first sign of atherosclerosis of the coronary arteries is sudden death; that is, the first sign is also the last. Thus, treatment is not a solution for these people, and primary prevention is the only recourse.

The National Heart, Lung, and Blood Institute (NHLBI) reports striking advances in the past 30 years. Since 1948, rheumatic fever and rheumatic heart disease mortalities are down 64 percent; stroke mortality is down 32 percent; death from coronary artery disease (which plateaued in the 1950's and early 1960's) is down 18 percent. The United States now has the lowest death rate in its history—just below 9 per 1,000 population—and the National Center for Health Statistics (NCHS) reports that a significant proportion of the decline in death rate since 1950 is due to the decline in cardiovascular mortality. The cardiovascular death rate declined 30 percent during that period, compared to 17.5 percent for nonheart deaths. More than one-half of the decline has occurred since 1968. As discussed below, knowledge exists in both lifestyle and services areas for continuing this favorable trend.

Hypertension is an extremely prevalent condition in the United States. During 1971–1974, 23.2 million adults, or 18.1 percent of adults 18–74 were estimated to have hypertension. More recent estimates place the number of hypertensives in the country at 35 million, with 20 million more people classified as "borderline" hypertensive. The rates ranged from 16 percent among white women to 29 percent among black women. The rates in black men are higher than rates in white men. Overall, for severe hypertension, the rate for blacks (11.1 percent) is nearly triple the rate for whites (4.1 percent) (*1*). It is not unreasonable to judge hypertension to be in epidemic proportions in the black population.

b. State of Knowledge About Prevention

The underlying etiology of most heart and blood vessel disease is arteriosclerosis. Epidemiologic studies have identified a number of primary risk factors for the clinical sequelae of arteriosclerosis (i.e., coronary heart disease, stroke and peripheral vascular disease). These risk factors include hypertension, hypercholesterolemia, cigarette smoking, and characteristics of personality (*2, 3*). What has not been demonstrated conclusively is the degree of reduction in death and disability that can be attained by avoidance of these risk factors.

Ancillary to the risk factors in cardiovascular disease is the role of nutrition in prevention of heart disease. Reduced daily cholesterol intake, saturated fat intake, and calorie intake have been associated with a prudent diet for primary prevention of cardiovascular disease (*4*). Diabetes is a nutrition-related condition associated with higher rates of heart disease. Obesity is felt by some to add to risk of cardiovascular problems. Professional and public awareness of hypertension as a risk factor has brought the hypertensive to treatment, reducing the blood pressure to normal in almost 8 million people. It has been estimated that significant numbers of deaths from all cardiovascular diseases have been avoided as a result of improved attention to the treatment of high blood pressure. Similarly, mass media education programs on healthy nutritional practices have proved to be successful in modifying factors associated with cardiovascular disease.

Cigarette smoking accounts for an estimated 25 percent of coronary heart disease deaths. Smokers are a declining minority (39 percent of men and 29 percent of women); however, there are still 50 million smokers in America today. In 1964, when the first Surgeon General's Report on Smoking and Health was issued, 52 percent of men and 32 percent of women were smokers. Because people continue to smoke for a variety of quite different reasons, a variety of cessation approaches are required. Women 35 years of age and over who use oral contraceptives and smoke heavily are a special risk group for death from heart attack and stroke (*8*).

Congenital and rheumatic heart diseases are serious problems which affect both children and adults in the impairment of life quality and often cause premature death. Prevention of rheumatic heart disease can nearly always be achieved through prophylactic use of antibiotics, while prevention of congenital heart disease is related to understanding the fetal development process and the general character of the defects. Research on sudden cardiac death continues to provide a better understanding of this entity which accounts for 50 percent of patients who die with coronary heart disease. It is now known that the terminal event that precipitates sudden cardiac death is usually ventricular fibrillation associated with increased irritability of the heart muscle. It may be possible to prevent the development of this fatal cardiac arrhythmia by long-term administration of antiarrhythmic agents in persons proven to be at particular risk. Lay person competence in cardiopulmonary resuscitation (CPR) may be of value in prolonging life until appropriate medical care is available. Organized systems of emergency medical service also can save many lives. Clearly, however, primary prevention of coronary heart disease is preferable, wherever possible.

Appropriate physical activity has been advocated as a measure to reduce the risk of coronary disease. Regular exercise is physiologically sound, of value in weight control, possibly preventive with respect to heart disease, and contributes to general well-being (*5*). (See II.K.) Weight control has not been proven to prevent cardiovascular disease, but obesity is associated with hypertension and high serum cholesterol (*5*).

Certain environmental factors have been suggested as risk factors for CHD—e.g., heavy metals and psychosocial stress, such as job stress. More research is needed in these areas.

Hypertension is also associated strongly with cerebrovascular accident. Treatment with antihypertensives is established as effective in preventing stroke (*6*); salt reduction in the diet may also be an important primary preventive (*7*).

Diabetes mellitus and impaired glucose tolerance are associated with atherosclerosis, and may be genetically related. However, it is not clear that diabetic treatment can reduce atherosclerotic complications (*6*). (See II.A.—Diabetes).

2. Cancer

a. Problem Definition

Cancer is the second leading cause of death in the United States. One thousand persons die daily from cancer. The 365,549 cancer deaths in persons age 1 year or more in 1975 was almost exactly half those caused by heart disease. The potential years of life lost in 1975 (3,841,801) also ranked second to heart disease, but the relationship was much closer: cancer accounted for 20.5 percent of all life-years lost, compared to 23.8 percent for heart disease. Cancer currently is estimated to inflict economic costs of $30 to $35 billion on the country.

A detailed discussion of cancer by sites is beyond the scope of this paper. A review of the data, however, highlights several salient facts (*4, 9*). Male cancer mortality exceeds female mortality by about 33,000 deaths, and the relative distribution by site is somewhat different between men and women.

For men, lung cancer displaced both stomach and colon-rectal cancers in the early 1950's as the leading cause of cancer mortality. Age-adjusted stomach cancer death rates have declined steadily since the 1930's. During the same period lung cancer rates rose precipitously; between the midthirties and the midsixties, there was an eightfold rate increase (*9*). In 1975 there were an estimated 63,500 lung cancer deaths in men (*4*).

For women, breast cancer displaced uterine and colon-rectal cancer in the late 1940's as the leading cause of cancer mortality. This was due more to declining rates of uterine cancer and, to a lesser extent, colon-rectal cancer, than to any dramatic increase in breast cancer, which was relatively stable during that period (*9*). It is useful to observe that cancer of the cervi uteri, although a source of fear and concern to the public, has become a relatively uncommon cause of death in women. The 7,800 cervical cancer deaths in 1975 were exceeded by such lesser known cancers as lymphomas (8,600), pancreas (8,600), and ovarian (10,800), as well as major causes such as lung (17,600) and breast (32,600) (*4*).

There are major geographic differences in cancer distribution, confirming the influences which varying modes of living and environmental conditions have on this disease. The National Cancer Institute's recent atlas of cancer mortality by county helps to pinpoint variances within the United States.

b. State of Knowledge About Prevention

More than 100 different diseases are grouped as cancer because of their common malignant characteristics. Human cancer is clearly multifactorial in origin where exogenous agents, such as environmental contaminants, occupational insults, therapeutic and diagnostic agents, interact with endogenous factors projected upon genetic background, culminating in the induction and expression of cancer. While it is true that no single factor is responsible for the development of most cancer, it is sometimes possible to identify the factors that are amenable to modification and thus to cancer prevention. In most instances, an insufficient amount of information exists to identify such causative factors. Examples of known or highly suspected causative factors include cigarette smoking, nutrition, certain occupational exposures, drugs, irradiation, and Sunlight exposure. The thrust of cancer prevention includes further identification of agents and factors which are responsible for human cancer and their reduction or removal from the environment prior to disease onset, or change in personal habits of individuals or populations through education so that they are at lower risk of developing cancer.

According to the American Cancer Society, cigarette smoking is responsible for one in every five cancer deaths. In addition to lung cancer, smoking has been linked to cancer of the larynx, pharynx, and oral cavity, esophagus, pancreas, and bladder. Cigarette smoking interacts with certain occupational exposures, such as asbestos and uranium, to greatly enhance the risk from either occupational exposure or smoking alone. Lung cancer risks increase directly with the number of cigarettes smoked per day, total lifetime number smoked, number of years of smoking, age at start, and depth of inhalation (*8*).

The prevention potential from smoking cessation is assisted by the fact that, unlike most carcinogens, damage from exposure to tobacco smoke appears to be reversible at early stages (*4*). The effectiveness of the best behavioral smoking cessation treatments is 70–100 percent immediate abstinence and 40–60 percent maintenance after 1 year. While not validated in large-scale demonstrations, this effectiveness compares favorably with the 10–20 percent 1-year abstinence achieved by people who try to stop smoking without help (*10*).

Environmental sources of carcinogens, mutagens, and teratogens can be controlled by preventing release of the agents into the environment, or removing them from the environment, or even removing them from man. Obviously, it is preferable to prevent human exposures to known carcinogenic agents. A limiting factor is the ability to screen new compounds for carcinogenicity as rapidly as they are developed and uses are found. In vitro assays have been promoted as alternatives to time-consuming animal bioassay, but more work is needed.

Modification of environmental agents is another possible prevention technique. Reduced tar and nicotine cigarettes provide an example of work on less hazardous cigarettes. Modification of asbestos fibers might be another example.

The occupational setting is a primary environmental source of exposure to carcinogens. Some examples of specific exposures with known excess risk of cancer greatly exceeding the general population are asbestos workers, coke-oven workers exposed to organic arsenic, and rubber workers (*10*). Radiologists and X-ray technicians may have excess exposure to ionizing radiation in hospitals—their workplace. Judicious use of X-rays in medical practice may be the most useful way to prevent hazardous and unnecessary exposure to radiation (*9*).

Bernard Greenberg has characterized the available methods to control hazardous agents (*10*):

- Substitution of the hazardous material with a safer one.
- Change in the manufacturing process to prevent escape or release of the offending agent.
- Isolation of the agent in some type of enclosure.
- Control of the source by engineering techniques such as exhaust methods.
- Personal protective devices such as special clothing.
- Education and motivation of workers and managers to comply with safety procedures.

Some studies link dietary factors to increased risk of cancer; e.g., high fat intake with breast cancer, animal protein with colon cancer, and perhaps bulk dietary fiber (*9, 10*). Behaviorial change, to adopt prudent dietary patterns with respect to fats, protein, and fiber is the focus of health education for general health promotion, and adds potential for reducing breast and intestinal cancers. Restriction of food additives found to be carcinogenic is also an important prevention technique. Prevention of alcohol abuse could contribute to cancer reduction, since alcohol is an important risk factor for certain cancers; e.g., upper gastrointestinal cancers. Sunlight is a readily avoidable environmental risk factor for skin cancer.

Secondary prevention, through early detection, is the focus of screening programs. Screening for cervical cancer by use of the "Pap" smear is a common preventive health service although it is unclear how much it has contributed to the decline in mortality rates, which began long before screening was introduced. Targeting screening to groups previously unscreened and to age groups most likely to have early stages of disease would require redistribution of current screening efforts.

Screening for breast cancer by mammography is a preventive health service recently criticized for excess use, since the X-ray itself is a cancer risk factor. Current guidelines of age and family history are intended to direct the procedure to high-risk individuals. Breast self-examination is a risk-management technique for which a woman can take personal responsibility. Genetics probably play a role in carcinogenesis, but have little relevance to prevention except to guide early detection programs.

3. Respiratory Disease

a. Problem Definition

Chronic obstructive bronchopulmonary disease (COPD) is characterized by chronic obstruction to airflow. Common respiratory ailments encompassed by the term COPD include chronic bronchitis, pulmonary emphysema, and reversible obstructive lung disease (bronchial asthma). The mortality and prevalence of COPD is probably underestimated, since it is often not shown on death certificates as a contributing cause of death. The NCHS Health Interview Survey (HIS) indicates that, in 1972, 147,000 persons reported chronic bronchitis as the main cause of their activity limitation, 473,000 reported emphysema, and 952,000 reported asthma, with and without hay fever (*11*). For 1976, some 24,410 deaths were reported for bronchitis, emphysema, and asthma.

b. State of Knowledge About Prevention

Chronic obstructive pulmonary disease continues to be the most disabling chronic respiratory disease. The relationship to smoking is well-known (*8*). The role of infection and chronic respiratory disease should also be recognized—e.g., the link between certain pneumonic infections and bronchiectasis.

The problem, however, is almost certainly multifactorial in nature. Air pollution, particular working environments such as those in the various mining industries (coal, granite, uranium), and other environments containing irritant particulate matter (cotton dust) play serious roles in the total national burden of this problem.

Air pollution sources produce large amounts of pollutants. For 1975, an estimated 18 million tons of particulate matter, 32.9 million tons of sulfur oxides, 24.2 million tons of nitrogen oxides, 30.9 million tons of hydrocarbons, and 96.2 million tons of carbon monoxide were emitted into the Nation's air. It is possible that 33 to 34 million people are at risk of being affected adversely by exposure to air pollutants because of age or underlying disease. While not as important as smoking to respiratory disease, reduction of pollution represents a preventive measure of appreciable impact on the general population.

Occupational lung diseases are also prevalent and must be considered in any research strategy to reduce respiratory problems. Among those of concern are asbestosis, black lung in the coal industry, brown lung from cotton dust, and silicosis. Since many workers who develop clinical lung disease smoke, the tendency had been to attribute the problems to smoking. It is becoming increasingly evident, however, that there are other major occupational factors alone or in combination with smoking that result in significant incidence of respiratory disease.

Over the past few years, studies on lung maturation and on surface-active material have led to the development of methods for prenatal identification of neonates at risk for respiratory distress, the single most frequent cause of death in the neonatal period. One-half to 1 percent of all newborns die from this disorder, and the sequelae for respiratory disease in later life are still under investigation. Studies leading to the identification of these neonates at risk have contributed to a decrease in mortality from this disorder. Other respiratory diseases, such as cystic fibrosis, are being researched to produce reliable techniques for genetic screening. Hypersensitivity pneumonitis and debilitating fibrotic changes in the lung can be caused by exposure to certain levels of organic and inorganic materials.

Similarly, research on emphysema indicates that one of the risk factors is a severe deficiency of one of the serum proteases. Research continues on the role of age and environmental factors in the development of emphysema in people with this deficiency.

4. Diabetes

a. Problem Definition

Diabetes mellitus is estimated to affect 5 percent of the U.S. population and account for over 100,000 deaths per year, ranking this as the fifth leading cause of death. Costs of the disease are estimated to be over $6 billion per year. While research has expanded knowledge regarding management of patients with diabetes, there appear to be major gaps in the accessibility and availability of care services to patients with diabetes, which if corrected would reduce morbidity and mortality from this disease.

Toxic chemicals can also destroy either the acinar cells of the pancreas, resulting in pancreatitis, or the islet cells, resulting in diabetes. Chlorothiazide, oral contraceptives, aflatoxin, cobalt, ethanol, carbon tetrachloride, ethionine and peromycin have been shown to be toxic to the acinar cells in man and experimental animals. Sufficient acute damage can be fatal. Lower levels of exposure over long periods of time can cause chronic degeneration of the pancreas which can also be fatal. Evidence for toxic damage to islet cells is largely experimental. It can be caused by alloxan, streptozotocin and cyprohetadine. These observations suggest that diabetes arising late in life may result from chronic exposure to low levels of toxic chemicals. If so, these have not yet been identified.

b. State of Knowledge About Prevention

Published reports suggest that availability of quality services can reduce hospitalization for diabetic coma by 77 percent, hospital days for patients with diabetes by 49 percent, and amputations among diabetics by 40 percent. Some notable deficiencies in services include lack of adequate services for nutrition counseling, and undue delays in entering an appropriate medical care system. Adult-onset diabetes has been shown to correlate significantly with obesity, but particularly with regard to childhood diabetes, prevention of diabetes and its sequelae may yet require considerable research. Recommendations are to increase basic research efforts concerning insulin, viruses, and glucagon, and the relationship between genetics and epidemiological factors and diabetes. Considerable research efforts are concentrated in the emergence of the debilitating and life-threatening long-term cardiovascular, neurologic, visual and renal complications of the disease. This involves studies on the relative effects of strict versus liberal controls of blood glucose levels. Some studies focus on the suppression of the insulin-antagonistic hormone glucagon because it is felt that effective control of glucagon hypersecretion could prevent the development of attacks of ketoacidosis in patients with juvenile diabetes and may have an ameliorating effect on abnormal elevated glucose levels. Other studies test the effectiveness of dietary control in reducing hyperlipoproteinemia in juvenile diabetes with the hope to reduce the cardiovascular complications associated with the disease.

The use of insulin has resulted in a marked shift in age specific death rates in insulin-dependent diabetic patients. The precision of control of blood sugar levels has not conclusively shown significant differences in the long-term morbidity and mortality of these patients. Many clinical trials are underway at this time to help elucidate how best to manage these patients to maximize the effective life of those organs most affected by long-term disease.

5. Arthritis

a. Problem Definition

Arthritis and related musculoskeletal disorders affect up to 21 million persons in the United States and are second only to cardiovascular disease in accounting for disability. With rare exception neither primary nor secondary preventive techniques have been devised for any of these disorders.

b. State of Knowledge About Prevention

Available knowledge in the field of arthritis and rheumatic disease is not complete enough to produce significant new forms of specific treatment or cure, or to lead to practical methods of primary prevention. The main thrust of the research effort in arthritis is toward identification of the specific causes of this disease; without such knowledge, rational means of prevention cannot be found. Epidemiologic studies and increased research in immunology, virology, genetics and the inflammatory process are approaches that can improve forms of treatment and eventually provide effective methods of prevention. While in the various rheumatic diseases, immunological and possibly viral causative factors are suspected and are being sought, in the case of osteoarthritis, wear and tear on the joints with overriding factors of heredity are the suspected causes. Much research is being done on the aberrant immunological factors, and the inflammatory process itself, which are involved in the initiation and perpetuation of joint inflammation and rheumatoid arthritis; other work centers on hereditary, developmental, anatomic and mechanical factors related to premature impairment of the cartilagenous joint surfaces in osteoarthritis.

Training in posture and weight-bearing may prevent back and other musculoskeletal disease in groups at high risk. The large numbers of persons affected along with the simplicity and inexpensiveness of this preventive technique argue for early study of its efficacy.

6. Neurological Diseases

a. Problem Definition

Neurologic disorders include epilepsy and other convulsive disorders, multiple sclerosis (MS) and other demyelinating disorders, and muscular dystrophy and other neuromuscular disorders. Stroke is a major problem—cerebrovascular accident is the third leading cause of death. Epilepsy affects 2 million Americans, in half of whom anticonvulsive drugs are not effective in fully controlling seizures. An estimated 500,000 persons in the United States suffer from MS and closely related disorders.

Some familial disorders, such as Huntington's Disease (HD) have a low prevalence (4 to 7 per 100,000 population for HD) but a catastrophic impact on the affected family. As many as 21 million Americans suffer from vascular headaches. Some 6,500 persons have spinal cord injuries annually. Neurologic disorders stretch across a wide variety of diseases and conditions, from minor ailments to incapacitating and fatal chronic conditions.

b. State of Knowledge About Prevention

Nervous system disorders occur in both early and adult life and their causes are largely undetermined, but are thought by some to stem from exposure to environmental factors such as insecticides, food additives, water and air pollutants, and head injury, in addition to hereditary factors. Slow viruses may also have a possible role in the onset of a number of neurological disorders. Defective virus particles, recently discovered, have demonstrated the role of chronic viral infections, heretofore unsuspected, in a number of chronic neurologic diseases, such as kuru, Creutzfeldt-Jakob disease, and subacute sclerosing panencephalitis. Research can lead to earlier detection of risk groups, thereby opening the way for prepathogenic preventive measures. It has been postulated that inhibited gastrointestinal or central nervous system absorption of thiamine leads to encephalopathy. Likewise, folic acid deficiency is linked to some biochemical aspects of brain development. This perinatal deficiency may influence development of seizure susceptibility.

Genetic counseling is a preventive service for affected families in a number of instances of hereditary diseases of the nervous system. Among persons with epilepsy of known cause, 43 percent are considered to be due to factors of pregnancy, labor, and the newborn period. Access to good prenatal and perinatal care may help avert some of these factors. The second most important cause of epilepsy is head injury; environmental and behavioral approaches to reduce injury associated with vehicle accidents, and injury control efforts in home and recreational settings, can contribute to prevention of epilepsy and other neurologic problems.

Prevention of stroke is of major importance—see discussion under cardiovascular disease, with emphasis on hypertension control.

B. REDUCED INCIDENCE OF COMMUNICABLE DISEASES

1. Problem Definition

Vaccine-preventable diseases of childhood include polio, rubella, measles, diphtheria, pertussis, tetanus, and mumps. Despite clear-cut recommendations, there are a significant number of children who are underimmunized. A decline in polio immunization status has been observed from peak levels attained in the early 1960's. In 1976, only

61.9 percent of children age 1–4 had a history of vaccination against rubella and 65.9 percent against measles. Although more than 95 percent of 1- to 4-year-old children had received one dose of diphtheria-pertussis-tetanus vaccine, only 71.4 percent received three or more doses; and three or more doses or oral polio vaccine were reported for only 61.6 percent of the children (*16*).

Influenza is a disease which, in epidemic years, can have an attack rate of 20 percent, and produce excess mortality in the tens of thousands—the elderly and the chronically ill are especially susceptible. At approximately one-decade intervals, the flu virus undergoes a major antigenic change, and significant spread of the new virus typically occurs. The 1977–78 fiu season was unique, with a new strain and two types of the previously circulating strain present in the United States at the same time.

Smallpox vaccination is no longer needed, as worldwide eradication of the disease has virtually been achieved.

Sexually transmitted diseases (STDs) remain a major public health problem. In 1976, the reported cases of syphilis began to decline, and in 1978 gonorrhea seems to be leveling off, after a number of years of 15 percent per year increases. At its peak, 1 million cases of gonorrhea were reported. Other STDs have become recognized as major public health problems in recent years—e.g., herpes virus and nonspecific urethritis. Highest rates of STD occur in teenagers and young adults.

Tuberculosis continues to decline as a public health problem. Rates are highest among blacks and other minorities, and in metropolitan areas. There were 33,989 new active cases reported in 1975.

Nosocomial (hospital) infections are a special area of infectious disease with major health complications. An estimated 5 percent of hospital patients acquire an infection while admitted. The consequences are endangered recuperation, increased length of stay, proliferation of antibiotic-resistant micro-organisms, and increased national expenditures for health care.

2. State of Knowledge About Prevention

Vaccination programs should use the full array of community resources: the medical community, voluntary groups, the communications media, the schools, organized primary care settings; as well as mass campaigns to immunize children and reduce spread of disease. Recent declines in measles, lack of occurrence of an expected rubella epidemic, and essentially random, rare occurrences of polio are evidence of efficacy of primary prevention through immunization. A rate of zero indigenous cases is an attainable goal for some programs.

Influenza vaccine should be made available on a routine basis to persons with chronic disease conditions which put them at high risk. Improved influenza vaccine would be of significant value in a national prevention program.

STD control relies primarily on sexual partner referral, screening, and education to interrupt transmission of disease. Improved clinical care would allow a more adequate response to patient needs. Special attention should be given to penicillin-resistant gonorrhea.

Hospital-acquired infections control is based on surveillance, an active hospital infection committee supported by infection control personnel, and adherence to known standards of care which prevent infection. Significantly lower rates of nosocomial disease can result from initiation of an infection control program.

C. REDUCED INCIDENCE OF TRAUMATIC INJURIES AND DEATH

1. Problem Definition

In the United States population aged 1 year and older, motor vehicle accidents ranked sixth as cause of death in 1975 (45,573 deaths) and all other accidents ranked fourth (56,046 deaths). Suicide ranked tenth (27,062) (*1*). Accidents, suicide, and homicide account for a significantly higher proportion of deaths among males than females. The distributions vary dramatically by age and race, attesting to the different physical and socioeconomic environments to which segments of the population are exposed.

When examining potential life-years lost, the relative youth of victims of accidents and violence emerges graphically. Among males, motor vehicle accidents, all other accidents, homicide, and suicide jump to second, third, fourth, and fifth in rank, and account for nearly one-third of all life-years lost. For males of all other races than white, homicide is the second leading cause (15.2 percent), and the leading cause of death for nonwhite males aged 18–24 (10 times the rate for white males).

Accidents are the leading cause of death among the young, and also cause considerable injury. The Consumer Product Safety Commission ranks the products with greatest hazard for children under 15: first, bicycles and bicycle equipment; second, steps; and third, swings, slides, seesaws, and playground equipment (*1*). Drownings are a significant cause of recreational accidental death.

2. State of Knowledge About Prevention

Accidents in the workplace are preventable by a variety of safety devices, from equipment guards to eye, ear, and hand protective devices. Workers need education in risk management and proper use of equipment. Drivers should also be a special focus; as many as 5,000 highway fatalities are estimated to result from tractor-trailer accidents. Despite known prevention measures, occupational safety remains a major public health problem, and needs more attention.

Injury control in home and recreational settings can prevent many accidents. Locks, bars, and other types of safeguards on windows prevent children from falling, and cities can institute programs to prevent such accidents. Epidemiologic investigations should be carried out to develop specific countermeasures tailored to local areas, for example, drownings in coastal marine areas. Bike lanes and bike safety education can reduce the toll of youth bicycle-related injuries.

Poison prevention among children was dramatically reduced when an environmental change was required through regulation—child-proof caps on aspirin bottles. In general, environmental modification is consistently more successful than educational approaches in preventing accidental injury.

The automobile is a special case. Great advances have been made in highway safety in recent years which reduce opportunities for accidents and lessen their severity. Automobile safety has also improved. Mandatory air bags and/or passive restraint systems will save many lives and much injury. In the interim, seatbelt education and required use can improve the current dismal record—only about 20 percent of the population use seatbelts consistently (7). Reduced auto speeds and reduced miles driven during the energy crisis had significant preventive impact as well. Recently, a link between traffic accidents and certain forms of uncontrolled epilepsy has been affirmed, indicating another area where prevention and traffic safety could have an impact.

Secondary prevention of traumatic mortality is based on systematic, rapid emergency medical services. An estimated 15 to 20 percent of the deaths due to traumatic injury and heart attack could be saved each year by improved emergency medical services. This would result in 60,000 lives saved, based on estimates by the National Academy of Sciences. Between one-half and two-thirds of heart attack deaths occur outside of the hospital and usually within 2 hours of the onset of symptoms. Similarly, the link between head truma and epilepsy, and between brain tumor and stroke compel rapid emergency medical services as preventive measures.

With careful enforcement, gun registration and control could potentially be a very important measure to assist in the reduction of both homicides and accidental injuries related to gun use. Almost two-thirds of the nearly 20,000 homicides in 1976 were by firearms and there were an additional 2,000 accidental deaths due to guns.

D. REDUCED INCIDENCE OF MENTAL RETARDATION AND CONGENITAL DEFECTS

1. Problem Definition

A profile of recent trends in childhood morbidity would show a sharp decrease in acute illness but an increase in chronic illness. Many children suffering from chronic handicapping conditions have survived serious prenatal, birth-related and/or postnatal injury or deprivation. It is estimated that 3 percent of the general population could be classified as mentally retarded at some point in their lives. In the preschool population only 0.5 percent are recognized as mentally retarded. Since three-fourths of the retarded have no visible physical defects, the condition is often not diagnosed until the child reaches school age, and the slow development of mental capacity and impaired learning ability become evident. Between the ages of 6 and 16, the incidence of mental retardation may exceed 10 percent in the inner-city ghetto. Of an estimated 6 million mentally retarded persons in the United States, 200,000 are in institutions, 300,000 are awaiting similar care, and 300,000 are found in general hospitals or prisons. More than 85 percent of the retarded live at home.

Although often an inadequate assessment, IQ scores have been used as a means to differentiate the severity of the mental retardation. The mildly retarded, who represent 85 percent to 90 percent of the total, score in the range of 50–70. They are capable of self-support and are considered educable to the fourth or fifth grade level. Their condition is usually recognized when they reach school age by their poor academic achievement. The moderately retarded (IQ of 35–50) are receptive to training and are capable of their own physical self-care. They are most productive economically within a protected environment such as their home or a sheltered workshop. This group is 5–10 percent of the total and is identified before school by their delayed development commonly accompanied by physical defects. The severely and profoundly retarded (5 percent of the total) have IQs below 35. They are usually identified in infancy because of their multiple disabilities; this group is generally dependent on others for their care (*15*). Congenital defects may result from environmental insult or genetic disease, or both. The interaction of the two is poorly understood. A significant and detectable malformation occurs in 24 of every 1,000 births, with twice as many congenital defects diagnosed in older children. Nearly a third of hospitalized children are there because of a prenatally acquired defect (*10*).

In the prenatal period exposure to a teratogen (any agent which can induce abormality in growth or structure) can lead to mental retardation or physical deformity. Exposure to a teratogen during the first trimester of pregnancy is likely to affect the formation of specific organ systems since this is the period of rapid embryonic differentiation. Exposure to the durg thalidomide during this period has been shown to induce severe limb defects. Maternal rubella infection in early pregnancy is associated with mental deficiency. Exposure to noxious agents in the second and third trimester is more likely to retard the general growth of the fetus. Fetal death or deformity can result from mechanical injury, chemical injury (drugs, hormones), malnutrition, infections, X-rays and maternal disease. Birth-related injuries are primarily due to mechanical trauma or insufficient oxygen during labor and delivery.

Factors associated with a higher risk of mental deficiency and/or congenital defect include:

> *Preconceptional*—Teenage pregnancy is associated with significantly increased infant mortality and morbidity as well as obstetrical complications. Inadequate prenatal supervision, lifestyle, and physio-

logic immaturity of the young mother contribute to poor pregnancy outcome.

Prenatal—Family history of mental deficiency or degenerative nervous system disease; small-for-date birth weight; smoking; alcohol abuse; prematurity—especially when extreme; poor nutrition; numerous pregnancies; relative maternal infertility; maternal toxemia; antepartum hemorrhage; maternal infections in first trimester—especially rubella; maternal age over 35 and under 17; toxic environmental agents; gene mutations; chromosome aberrations; cretinism; cerebral palsy; use of drugs; and exposure of the fetus to occupational hazards.

Birth-related—Severe anoxia; prolonged labor; breech presentation, inappropriately sized uterus, and poor condition at delivery such as convulsions—especially when induced by hypoglycemia, cerebral hemorrhage, hyperbilirubinemia, or cerebral palsy.

Postnatal—Meningitis; encephalitis; severe hypoglycemia; hypernatremia; head injury; lead poisoning; epilepsy; emotional deprivation; and poor home or family environment (*15*).

2. State of Knowledge About Prevention

Prevention of mental retardation from biologic causes can be very effectively carried out by a pregnant woman who understands the following approaches:

- Immunization, particularly against rubella and poliomyelitis before pregnancy.
- Genetic counseling for individuals at particular risk for an affected infant, so that they understand the risks assumed if various courses of action are adopted.
- Good prenatal care, because mental retardation from biologic causes is highly concentrated among premature and low-birth-weight infants. Avoidance of unnecessary radiation is particularly relevant to prevention of mental retardation.
- Protection from exposure to environmental agents, at home, and in occupational settings.
- Adequate maternal nutrition, because poor nutrition may contribute to learning disabilities or to retardation of the infant.
- Avoidance of cigarette smoking and heavy alcohol use during pregnancy.
- Training in child care for pregnant women inexperienced in infant care and child rearing.
- Fetal monitoring for pregnancies unavoidably at high risk. This includes: Prenatal diagnosis for fetuses at known high risk of Down syndrome (women over 35 or those with translocation of chromosome 21), or of other genetic diseases associated with mental retardation and for which prenatal diagnosis by amniocentesis, ultrasound, alpha fetoprotein determination, or other means is available; monitoring during labor for fetal distress

evidencing anoxia, for which appropriate corrective measures are often available. Anoxic brain damage is a prominent cause of mental retardation; and postnatal diagnostic screening for metabolic diseases and for hypothyroidism.

While many of the above measures depend on good medical care, the parents must be motivated to seek it out and should understand those aspects particularly applicable to their own needs. Health education should be provided to equip families with risk management knowledge and skills needed to avoid, reduce, or cope with their risk factors.

Prevention of congenital defects is largely a repetition of subjects already mentioned, with particular emphasis on a women's motivation, as necessary, to seek and accept immunization before pregnancy, early prenatal diagnosis, genetic counseling, and avoidance of alcohol, drugs, and radiation during pregnancy including, insofar as an individual can, environmental exposures in the workplace or elsewhere to chemicals and radiation.

A woman contemplating pregnancy should know that she must protect herself against infections affecting the fetus (notably rubella) and against alcohol, drugs, potentially harmful chemical compounds, and radiation before pregnancy where appropriate and during those early weeks before pregnancy is recognized and when the fetus is, unfortunately, at particular high risk of damage. However, responsibility should not rest with the individual alone. Women of childbearing age and health professionals who render care to them should be educated regarding teratogenic chemicals to which women may be potentially exposed. Development of new knowledge and the implementation of standards governing teratogenic substances as provided for under environmental laws should be rigorously pursued. Screening of chemicals for teratogenicity is an appropriate preventive measure for this population at risk.

Modifications of factors associated with the socioeconomic environment can be form of primary and secondary prevention. The damaging effect of poverty with its associated deprivation of life experiences is regarded as the leading cause of mental retardation. Children and families at risk due to poverty and associated environmental deprivation incur added risk due to biological events. There is, then, a synergism of environmental and biological conditions contributing to high-risk infancy and early childhood.

E. REDUCE THE INCIDENCE OF MORBIDITY AND MORTALITY ASSOCIATED WITH PREGNANCY AND THE NEONATAL PERIOD

1. Problem Definition

The infant morality rate in the United States declined significantly between 1950 and 1975, from a rate of 29.2 deaths under 1 year of age per 1,000 live births to a rate of 16.1 per 1,000. There is a major disparity between the rates for whites and the rates for all other races—a gap which has persisted during the entire period (*1*). During the last decade, the rate for all other races has consistently been two-thirds again as high as the rate for whites (22.1 per 1,000 and 13.4 per 1,000, respectively, in 1975).

Problems can begin to occur even before birth, particularly with respect to toxic substances. More chemical damage may be done during embryonic development than during any other phase of the human life cycle. Over one-third of early embryos abort before the pregnancy is recognized, and about 15 percent of recognized pregnancies abort spontaneously. Among the surviving fetuses, at birth, approximately 3 percent have developmental defects of form, chemical content or function; with increasing age or 7 percent (210,000 per annum), show detectable defects. Of the hundreds of agents known to be teratogenic in laboratory animals, about 25 are presently known to affect humans; many of the rest are suspected.

High-risk pregnancies are those that have a high probability of resulting in the birth of an infant who will have a developmental defect, will require intensive care during the first weeks of life, or will die in infancy, as well as those in which the mother is at higher than normal risk of death or disability from complications during pregnancy, labor, delivery, and postpartum. Such pregnancies more often occur where the mother is either too young (less than 17 years) or too mature (over 35 years), or where the mother suffers a chronic illness such as diabetes mellitus or hypertension. There is epidemiologic evidence that depressed socioeconomic status constitutes a high risk in pregnancy and suggestive evidence that a childhood and adolescence marked by marginal nutritional status contributes to poor physiologic preparation for pregnancy. A special risk group is the adolescent who becomes pregnant.

One of ten teenage girls, which means 1 million adolescents under age 19, become pregnant annually. Evidence suggests that 56 percent of these pregnancies and 45 percent of these births were unintended. Almost 600,000 adolescents give birth annually; this is about one-fifth of all births in the United States; within this group, pregnancies in women aged 15 and under are at highest risk. Ninety-three percent of all adolescent mothers keep their babies, an increase of 8 percent over the last 5 years.

Childbearing during adolescence entails high health and social risks for both mother and child. Compared to women 20–24 years of age, the risk of maternal death is 60 percent higher. The risk of complications of pregnancy and childbirth, such as toxemia, anemia, and premature and prolonged labor, are higher.

Although prenatal care can effectively reduce premature births and neonatal deaths, approximately 10 percent of women giving birth in the United States have had little or no prenatal care. Lack of prenatal care exposes these women and their babies to greater risk of poor pregnancy outcome, and this group of women may also be inherently at greater than average risk. An inadequate proportion of the resources available for maternal health care in the United States is applied to finding high-risk women and providing both basic and special care to them. A disproportionately large amount of our maternal health care resources is used to provide sophisticated and expensive care to relatively low-risk women.

A number of medical diagnostic and therapeutic techniques, which were originally developed for use with high-risk or complicated pregnancies, are now being applied to an ever-expanding proportion of pregnant women. In general, these procedures are invasive and have their own risks of causing iatrogenic infant and maternal morbidity and mortality. The ratio of inherent risks of these procedures to the benefits of their use decreases and may fall below unity—i.e., they may cause more morbidity and mortality than they prevent—as they are used on an even larger proportion of cases including fewer high-risk pregnancies. Although many of these techniques have been found beneficial in high-risk or complicated cases, there is considerable question whether their risks and costs outweigh their benefits in cases not known to be high-risk or complicated.

2. State of Knowledge About Prevention

The intent of this goal is to assure a normal, healthy pregnancy and delivery, with a healthy mother and child (who is wanted) as the outcome. Prospective parents should know that most of the mortality and morbidity related to human reproduction is avoidable with proper application of known methods.

Effective family planning methods are available so that pregnancies can be accommodated to a family's circumstances or, if necessary and appropriate, avoided altogether. Prospective parents, both male and female, need to know where to obtain information and services from sources that are inexpensive, readily available, competent, and sympathetic.

Principles applicable to good prenatal care, on which an informed and motivated individual could act, are the avoidance of smoking, alcohol, illegal drugs, and all legal drugs except those prescribed by a physician and essential for curative or health maintenance purposes. Even caffeine has become suspect. Avoidance of exposure to chemical compounds or radiation in the workplace or environment is more difficult for an individual and requires regulation at other levels, but individual knowledge and concern should emanate from good prenatal care.

Medical management beginning either before or certainly early during pregnancy can ensure that a woman with some chronic or acute illness has the best chance of avoiding harm to herself or to the fetus. Diabetes, toxemia, and various kinds of malnutrition are notable examples for which a safe pregnancy for both mother and fetus is relatively certain with good care, but otherwise highly unsafe to either or both.

Morbidity and mortality among neonates is highly concentrated among those prematurely born or with intrauterine growth retardation. Many of these births can be prevented or made normal by good prenatal care beginning before or early during pregnancy.

Adolescents, particularly those 15 and under, are at particularly high risk. There is good evidence that with good prenatal care of a kind particularly suited to the needs of adolescents, the risks can be reduced probably to normal, certainly virtually to normal. In particular, good nutrition prior to and during an adolescent pregnancy is a critical factor in assuring an infant of normal birth weight.

The preferred strategy is to prevent unwanted pregnancies. For those that do occur, however, preparation for the infant, particularly with regard to preparing the mother, is essential to avoid a high incidence of child abuse and neglect. Unmarried adolescents are particularly in need of instruction and counseling. The early postnatal relationships between mother and father and infant are thought to be important, and are likely to be damaged by requirements of neonatal intensive care even under the best of circumstances. With intensive care, much added effort is required.

The sudden infant death syndrome is the most common cause of death in the age group from 1 to 12 months. Again victims are highly concentrated in the premature and low-birth-weight group, and prevention through good prenatal care is the best approach. Postnatal monitoring of infants at risk for cardiac and respiratory arrest is not yet in a stage to be generally recommended, though this may change in the future. Both identification of infants at risk and the development of safe, effective, and psychologically acceptable monitoring devices require further work.

F. REDUCED INCIDENCE OF DENTAL DISEASE

1. Problem Definition

By age 6, children in the United States average more than three teeth (primary and permanent) affected by caries. By age 17, more than eight permanent teeth, on average, are so affected and 15 percent of 17-year-olds are missing three or more permanent teeth. Almost 90 percent of children 12–17 years of age have at least one decayed, missing or filled (DMF) tooth and more than 20 percent have 10 or more such teeth. Young children of low-income families have more than four times the number of unfilled cavities as children of higher income families.

Periodontal or gum disease, a major cause of tooth loss among adults, usually begins during the childhood years. Among children 6–11 years of age, nearly 40 percent have gingivitis or inflamed gums. More than 60 percent of children between 12–17 years of age have the same problem.

Over one-half of persons 65 years of age or older have lost all of their natural teeth from dental caries and periodontal disease. The poor dental health status of adults is largely determined by lack of an adequate dental health treatment and prevention program afforded them as children.

2. State of Knowledge About Prevention

The general objective of a prevention program for childhood dental health is to improve the oral health of today's children and tomorrow's adults. It should encompass both primary and secondary prevention in order to intercept dental disease processes before they cause loss of teeth. Elements of such a program could include:

- Expanded utilization of community and school water fluoridation: this is the cornerstone of any public health effort to control dental caries. Fluoridation can reduce the amount of tooth decay in schoolchildren by up to 65 percent. Benefits begin in early childhood, but extend into adulthood. However, 40 percent of the population on public water supplies still does not receive fluoridated water.
- Other preventive procedures including dietary fluoride supplements, fluoride mouth rinses, fluoride dentifrices, reduction of sugar intake, adhesive sealants, and brushing and flossing of teeth.
- Dental treatment services including diagnostic, preventive, restorative and maintenance care.
- Oral health education to arm children with the knowledge, skills and motivation to practice oral home care procedures and to utilize periodic professional assistance with oral health maintenance.

In the lifestyle area, nutrition plays a prominent role in dental health. Reduced consumption of sugar, both in terms of total intake and frequency of intake, is of great importance to healthy dentition. Adequate intake of calcium and protein for healthy teeth and gums, is also part of a prudent diet.

Parental role modeling, particularly the mothers, has been shown to influence personal oral hygiene and dental visit behavior in children. Health education programs should promote skills that families need in order to understand and to avoid health risks, including dental health, by enhancing the skills of parents in teaching children good dental health habits.

Dental disease prevention contributes to physical well-being. It can also promote emotional well-being; for example, enhanced facial appearance can help improve self-esteem while bad dentition can be detrimental to self-esteem.

Alcohol and tobacco use contribute to oral cancer. While not "dental disease," cancers in the oral cavity, and other preventable conditions as well, should be considered in the practice of preventive dentistry. The dentist may see healthy adults more frequently than other providers, and therefore may be an effective screener for these conditions, for referral to prompt medical attention.

G. REDUCED INCIDENCE OF DISEASES RELATED TO VISION AND HEARING

1. Problem Definition

Refractive errors affect a significant precentage of the population. In the age group 4–74, tested in 1971–72 by the National Center for Health

Statistics, about 1 in 4 had less than 20–20 vision with "usual correction" (33 percent of those tested wore glasses or contact lens during the test). Among youths 12–17, 70 percent had normal visual acuity (distance) while 17 percent had moderate to severe defective acuity.

Among children aged 6–11 strabismus was the most frequent eye condition found. An estimated 1.6 million children in that age group had manifest or latent strabismus.

Glaucoma is a serious cause of visual impairment. The prevalence of visual impairment due to glaucoma is estimated to exceed 1 million, second only to cataract among serious causes of impairment. The prevalence is higher in women than men. Retinal vascular disease is a leading cause of blindness in the United States, with one-sixth of newly recorded blindness in 1970 attributed to retinal circulatory abnormalities. Diabetes mellitus is the cause of most of this blindness.

In the 1971 Health Interview Survey, over 14 million persons reported hearing impairment; 330,000 of these reported total deafness. Hearing impairment rose with age, and was higher in men than women. It was considerably higher for those outside metropolitan areas than for those in Standard Metropolitan Statistical Areas.

2. State of Knowledge About Prevention

Prevention of refractive error is essentially not possible. Schoolchildren should be screened at school entry, and periodically thereafter, since impaired vision might affect school performance, and safety.

Strabismus, if untreated in early childhood, may subsequently lead to amblyopia, visual deterioration in one eye. While easily diagnosed in routine screening programs, school entry screening is too late. The problems must be corrected in the pre-school child to preserve sight.

It is now known from the nationwide Diabetic Retinopathy Study sponsored by the National Eye Institute that the risk of blindness from diabetic retinopathy can be reduced by photocoagulation.

Vision loss due to accidental injury is an important problem. Safety glasses are a simple primary prevention technique. Workers in industries were potential eye injury exists should be instructed in the dangers and value of safety glasses. "Do-it-yourself" projects around the home also require eye protection. Safety practices to protect vision should be incorporated into health education programs.

Secondary prevention of glaucoma is based on screening for intraocular pressure. There is controversy whether routine screening for glaucoma is cost-beneficial and also whether treatment reduces visual field deficit. It will reduce progression of the problem. More knowledge about the management of ocular hypertension may be needed to justify routine screening programs.

Loss of vision due to iridocyclitis that occurs in about 25 percent of cases of the pauciarticular form of juvenile rheumatoid arthritis (JRA) can be prevented or retarded by screening all possible cases of pauciarticular JRA with a slit lamp examination and treating ocular involvement.

But it is not known how many of the 2,000–5,000 JRA cases occurring each year sustain preventable visual impairment.

Noise-induced hearing loss is a potentially serious problem which is important to prevent at both primary and secondary levels. Sources of environmental and occupational noise should be reduced, and ear protective devices worn in high-noise occupations and avocations, such as snowmobiles and target shooting. Workers with evidence of early hearing loss should be protected from further loss.

Otitis media frequently occurs among children in low-income families. The chronically draining ear with subsequent hearing loss is frequently found in these children. Trials of prophylactic antibiotics suggest such treatment is useful in high risk populations. Bacterial vaccines are potentially of value in preventing otitis media.

For hearing disorders the child may initially be referred to an audiologist who may confirm the presence or absence of hearing by more sophisticated testing. The results of the evaluation may determine recommendations for further treatment.

H. REDUCED INCIDENCE OF EMOTIONAL DISORDERS

1. Problem Definition

In spite of methodological difficulties with regard to definition of a "case," a consistent set of relationships has been observed between mental disorders and factors such as sex, social class, and place of residence. For example, females have the highest rates of neurosis and manic-depressive psychosis, while males have relatively high rates of personality disorders. With regard to location, manifestations of anxiety, milder forms of depression, phobias, self-doubt, and other neurotic symptoms are higher among people who live in the cities. Only manic-depressive psychosis appears to be higher in rural areas. The highest rates of psychiatric disorders have been found among people with lowest levels of income, education, or occupation (*4*).

In 1971, a total of 1.7 million patient care episodes were reported in inpatient psychiatric services. The most common diagnoses were schizophrenia (537,000) and depressive disorders (322,000). In 1974, 5 percent of persons with activity limitation reported mental and nervous conditions as the cause (*1*).

One-fifth of all Americans will suffer from an affective disorder at some time during their lives. Depression and manic depressive disorders are among the most severe types of mental illness in terms of prevalence, economic cost, and mortality. Of the 20,000 suicides recorded in the U.S.A. each year, more than 80 percent are believed to be precipitated by depressive illness. Crippling conditions marked by extreme sadness or manic excitability afflict an estimated 2 to 4 of every 100 adults at any given time.

2. State of Knowledge About Prevention

An abundant knowledge base exists in the mental health field to begin to move effectively toward reducing much of the emotional stress experienced by many Americans, and to promote the well-being of the American people. By and large, however, this knowledge base is not being used. The provision of services derived from this knowledge base is underdeveloped and occupies low priority within mental health facilities, which focus virtually all their staff and budget resources on individuals experiencing psychological dysfunction/emotional disturbance/psychiatric illness.

As Dr. Bernard Bloom has pointed out: "There is every reason to believe that preventive services linked to stressful life events can be enormously effective, particularly when we set about to build on what is already known about crisis intervention." Few sustained services exist, however, within our culture to assist people in mastering stressful life events, such as marital disruption, retirement, and widowhood.

In addition, there is a growing knowledge base relating to (a) competence and competency-building, (b) preventing "learned helplessness," (c) promoting self-esteem, (d) effects of critical life events, and (f) the predictability of many life crises. While an extensive knowledge base exists with respect to these areas, considerable additional research is needed.

Primary prevention activities in the mental health field are focused on reducing the likelihood of occurrence of mental and emotional disturbances, and promoting individual, family, and community competencies and strengths as related to sound mental health. Scientific evidence exists to obviate some needless emotional distress, especially disturbances evoked by situational life crises such as death, divorce, marital separation, and retirement. Further research effort is needed to explore the basic facets of various life crises and transition states such as wife to widow and worker to retiree in order to discover knowledge essential to dealing effectively with specific subpopulations who are at high risk to experience a crisis situation as well as persons already in crisis states. Knowledge gained from more research and the application of presently available knowledge will lead to new forms of outreach, new educational approaches, and more responsive community mental health services.

Utilizing primary prevention approaches offers promise for both reducing the possibility of disturbance and for elevating the level of mental health and well-being within communities—the fundamental objectives of community mental health services.

- The scope of mental health extends beyond exclusive concern with the psychiatrically ill into virtually all areas of human behavior.
- Problem areas which are fundamentally public health matters having mental health components offer significant opportunities for mental health workers to implement the principles and practices of community mental health.

- The occurrence of life crises provides a relevant framework for developing community programs aimed at helping people to deal with real life problems; i.e., those critical events which require specific coping capacities and ego strengths in order to maintain physical and mental health.

Illustrative broad problem areas amenable to primary prevention efforts include: identifying factors which facilitate effective coping; providing counseling to the 1½ percent of the total American population which is affected directly by divorce each year; outreach to families affected by death; preparation of children for hospitalization for physical ailments; facilitation of parent-child communications; intervention for postpartum disturbances; promotion of mutual help groups; and studying relationship of nutrition and exercise with mental health.

I. REDUCED INCIDENCE OF ALCOHOL AND DRUG ABUSE

1. Problem Definition

The most serious problems of substance abuse are tobacco, alcohol, and habituating drugs. Smoking has been discussed under II.A above, as a risk factor for chronic disease. The discussion of the alcohol abuse and drug abuse problem in the United States is taken from the excellent review in the Institute of Medicine staff paper on prevention (7).

a. Alcohol Abuse

In the United States there are an estimated 10 million problem drinkers, of whom 6 million may be alcoholics, among the 100 million or so who consume alcohol. About 3 to 5 percent of alcoholics are homeless and dependent on institutional support. Approximately 10 percent of the Nation's work force are alcoholics or serious abusers, and in one study of hospital ward patients the prevalence of alcoholics (usually unrecognized as such by their attending physicians) was 28 percent for males and 6 percent for females. Although American Indians are a heterogeneous group, overall they have one of the highest rates of problem drinking of all ethnic groups. Preliminary findings indicate a potential physiologic difference in alcohol metabolism rate among Indians.

The known prevalence of alcoholism in adult males is several times greater than in females, with the most commonly quoted ratio, 5.5:1. This difference appears to be diminishing either because of increased drinking among women, or because of growing numbers of women who seek treatment or otherwise become "visible"—through greater participation in the work force, for example—or a combination of these and other factors.

Consumption of alcohol—particularly beer—is common among teenagers. Approximately 42 percent of 12th grade males and 15 percent of

12th grade females drink beer once a week or more, according to a 1974 nationwide survey of 13,000 junior and senior high school students. The same survey found 27.8 percent of the students were problem drinkers. (Because dropouts were not included, these figures are probably underestimated.) Alcohol abuse can begin in adolescence, young adulthood or middle age, remain a lifelong problem, and lead to premature death. As the disease becomes manifest it has many pernicious effects: biological, psychological, and social consequences for the alcohol abuser; psychological and social effects on family members; endangerment of the physical well-being of family members and others, especially by accidents or violence; and social and economic consequences for society at large, which must pay for the problem drinker's maintenance—either indirectly because of decreased productivity, or outright through welfare.

Specifically, alcohol use is associated with an annual toll of 25,000 traffic fatalities, 15,000 homicides and suicides, and almost half of annual police arrests. The economic cost of alcohol abuse has been estimated to be from $25 to $40 billion per year in lost work time, health and welfare services, accidents and medical expenses (7).

b. Drug Abuse

Information on prevalence regarding illicit drug use is, by nature, inexact. Often it depends on self-reports, which may be unreliable. In surveys, significant population groups—particularly transients—may be missed.

In 1975, there were an estimated 522,000 to 559,000 heroin addicts in the United States.

An estimated 36 million Americans have tried marihuana, and almost 15 million can be classified as current users. Among males ages 20 to 24 who have ever used marihuana, 17 percent are daily users.

According to recent interview data, 2.8 percent of all youth ages 12 to 17 and 4.4 percent of all adults 18 and over had ever taken prescription sedatives for a nonmedical use, 3.3 percent of all youth and 4.0 percent of all adults had ever taken prescription tranquilizers for a nonmedical use, and 4.4 percent of all youth and 7.9 percent of all adults had ever taken prescription stimulants for nonmedical use.

Cocaine may have been tried at least once by 8 million Americans, with 1 million current users. A nationwide survey reports that about 1 percent of those interviewed currently use cocaine, with about 3.4 percent of 12- to 17-year-olds and 4.1 percent of those over 18 having ever used it.

One in 20 Americans has experienced hallucinogens, with current use reported by 0.9 percent of 12- to 17-year-olds and less than 0.5 percent of those 18 and over. Prevalence estimates for youth are relatively unchanged since a 1972 study of hallucinogen use conducted by the National Commission on Marihuana and Drug Abuse (7).

Heroin is highly addictive. Among its deleterious health effects—many of which are consequences of its illegal status—are overdose reactions, including death, hepatitis, endocarditis, and other infections from contaminated equipment, reactions to impurities in the drug, and chronic undernutrition resulting from an addict's concentration of resources on obtaining a daily heroin supply.

In regard to marihuana use, the hazard of intoxication while driving is of particular concern. Some physical effects on the immune response system, lungs, basic cell metabolism, and others have been indicated by preliminary laboratory findings, whereas research reporting other effects such as brain damage, psychosis, and chromosome abnormalities has been questioned. Good documentation of the harmful effects of chronic marihuana use does not yet exist.

Abused depressants and stimulants include many drugs ordinarily prescribed for their medical effectiveness. Excessive doses of depressants over a long period result in both physical and psychological dependence, with abrupt withdrawal, particularly from barbiturates, leading to convulsions which may produce permanent disability or even death. Overdoses of barbiturates—either accidental or intentional—are a leading cause of drug overdose fatalities. Combination of barbituates with other drugs, particularly alcohol, greatly increases the chance of a lethal outcome.

The body develops tolerance to amphetamines, but even a tolerant abuser can experience high blood pressure, abnormal heart rhythms, loss of appetite, and psychological effects. Overdoses can lead to convulsions and possible death. Cocaine has similar body effects, induces euphoria and reduces feelings of fatigue. Physical dependence does not develop, although psychological dependence may occur. Some deaths due to toxic reactions to cocaine have been substantiated.

All hallucinogens distort the perception of objective reality. Potentially fatal reactions can occur, and the unpredictable psychic effects may result in unintentionally dangerous behavior. Physical dependence apparently does not develop, although tolerance may.

The prevalence of polydrug use—including use with alcohol—increases the physical hazard considerably. Furthermore, many of them are illicitly manufactured or sold, or both, and are often contaminated, of uncertain potency, or misrepresented, leading not only to an increased likelihood of medical emergency, but also to a more equivocal treatment situation.

2. State of Knowledge About Prevention

Primary prevention of alcoholism depends essentially on education. Since alcohol use decisions are often related to other personal behavior choices, education in a comprehensive lifestyle program may have greater effectiveness. Primary prevention of fetal alcohol syndrome (FAS) is achievable. By educating women not to drink while pregnant, FAS could be prevented. Clearly, effective risk group identification and targeted education are needed.

Education of youth in substance abuse is directed toward the health consequences of abuse and providing self-management skills to enable them to avoid excessive use. Another prevention objective is to increase the ability of young people to detect and counter subtle peer pressures often associated with beginning use of alcohol, tobacco, and drugs.

The alcoholic content is voluntarily being reduced in the manufacture of some types of alcoholic beverages, thus reducing the rate of intoxication per quantity consumed. Regulatory approaches, however, still currently appear to be the most effective means to control the use of alcohol. Taxation provides economic disincentives to heavy drinking by raising prices. Control on number of outlets, days and hours of operation, and legal age for purchase, can restrict use. Heavy penalties on driving while intoxicated may deter one of the adverse consequences of problem drinking.

Prevention of drug abuse requires strategies tailored to a variety of risk groups. A major target group is youth, the period when experimentation and heavy drug use is occurring. Information and education is an element of most prevention approaches. Another is providing alternatives to compete with the appeal of drug use.

Control of the supply of illicit drugs is carried out by law enforcement agencies. While limiting supply would in effect prevent use, complete cut-off of supply seems unlikely. Community, school, and youth organization efforts to prevent use will continue to be needed.

J. ENHANCED DEVELOPMENT OF CHILDREN AND ADOLESCENTS

1. Problem Definition

For adolescents, accidental death and disability (see II.C.) and sexuality and fertility (see II.E.) are important aspects of health and development. Their socioeconomic environment is an important determinant of health status, as well.

The health status of a poverty-group adolescent can only be evaluated in view of his earlier life and family environment. This individual's mother probably did not receive adequate prenatal care, and the youth probably did not have adequate nutrition in infancy and childhood or early resolution of health problems. Many of these adolescents are at risk and are not likely to receive adequate medical or support services without aggressive outreach. It has been shown that economically disadvantaged youth are at higher risk to become pregnant, to have acute psychiatric illness, to be dependent on drugs, to attempt suicide, to have insufficient immunization against polio and rubella, as well as many other health problems. Fielding and Nelson charged that while Medicaid had removed the financial barrier for many, it has had little beneficial impact on access to services.

Adolescent pregnancy presents significant adolescent health problems, such as higher risks for toxemia, prolonged labor, iron-deficiency anemia, hypertension, maternal death, and stillborn, premature and low-birth-weight babies. A teenager's ability to conceive often precedes the development of sufficient pelvic capacity for normal childbearing. Low-birth-weight babies are at high risk to die in infancy, to have subnormal mental capacity and neurological impairment and/or congenital defects. In 1965 the rate of prematurity (defined as birth weight of less than 2,500 grams) among pregnant adolescents was two times that for the total population. In addition to these health problems, there are significant social problems associated with teenage pregnancy. Early childbearing is associated with disruption of schooling, illegitimacy, high rates of repeat pregnancy and public dependency. A survey of 154 school districts showed that one-third still required immediate expulsion upon detection of pregnancy, and less than half of these districts provided for continuing education. A followup study of pregnant teenagers in a Connecticut hospital showed that 44 percent of the girls were pregnant again within 1 year of their first delivery (*17*).

Maternal and infant deaths increase with higher parity and short intervals between births. Obviously, many of the preventive health services discussed under the preceding health status goals are especially needed in this group (*17*).

For children, the use of immunizing agents against vaccine-preventable disease, and improved medical management of infectious disease through development of chemotherapeutic drugs and antibiotics, account for large portions of morbidity reduction in this group. The interplay of nutritional problems and gastroenteritis is a major focus of attention in disadvantaged subgroups.

Accidents (see II.C.), especially those occurring in the immediate vicinity of the home, represent the major cause of death among this age group; prevention is best approached through environmental modifications and education about risk management.

Circumstances that place children at risk of interference with normal growth and development are a special consideration in child health. In a general population of children, prevention of communicable disease, well-child care as well as quality primary care, and early detection and care for children with physical and emotional problems are obvious needs. In addition, abundant evidence supports special services for high-risk groups, such as low-birth-weight infants, pre-school-age children in low-income families, children living in arrangements apart from their own homes, and children known to have handicapping conditions. Genetic screening for inborn errors of metabolism and hypothyroidism testing are important aspects of preventive health services for infants.

2. State of Knowledge About Prevention

Programs designed to intervene early in the problems of high risk children and adolescents can prevent a significant amount of disability and dysfunction. Much of this has been discussed in the context of other strategy targets, but four special targets warrant discussion here.

a. Learning Disabilities

It has become apparent that a distressingly large number of children in our schools are having difficulty learning to read. These children usually possess normal intelligence and may not exhibit any identifiable physiologic or psychologic abnormality. Without considerable efforts to assist in diagnosing and treating learning disabilities, these children move through the schools without ever really learning to read, an inability that can be a lifelong handicap.

The learning of the complex skill of reading is influenced by a variety of factors: knowledge of the language, intelligence, home background, emotional stability, and quality of school instruction. There is, however, a group of schoolchildren who appear to have an inexplicable reading disorder—a disability that cannot be clearly related to factors known to retard reading achievement. The term developmental dyslexia is commonly used to describe the condition. The children involved are intelligent within the normal range, as measured by IQ tests, and their sensory systems are apparently unimpaired. They are thus endowed with the mental faculties required for developing reading skills. Their reading achievement, however, is below expectation when compared to their mental age or their chronological age.

Ninety-two percent of public elementary schools report having pupils with severe reading problems. Fifty-four percent of these schools provide some special reading instructions. However, a recent survey indicated that over 1 million schoolchildren, ages 12 to 17 years are illiterate; that is, they cannot read at the beginning fourth-grade level. Twenty-five percent of students in large elementary schools in large cities have reading problems. An estimated 10 percent of school-age children are thought to be afflicted with developmental dyslexia.

b. Sudden Infant Death Syndrome (SIDS)

Each year in the United States, SIDS claims the lives of an estimated 6,000 to 7,000 infants who die suddenly, quietly, and unexpectedly in their cribs, during what has been considered to be normal sleep. This is an incidence rate of about 2 per 1,000 live births. It is the leading cause of death between the ages of 1 and 12 months—as 50 percent of infant deaths occurring between the first month and first year of life in this country can be attributed to SIDS.

The cause of death for these babies remain a mystery. The peak incidence of SIDS is between the second and fourth months of life. The risk is higher in males than in females, in black babies than in white babies, in one of twins as compared to single born babies, in low birth weight infants and particularly in infants whose gestational ages at time of birth were between 34 and 35 weeks, and in babies who have had recent upper respiratory infections.

The highest rate of SIDS is among children of mothers less than 20 years old. The risk is more than four times as great for those infants whose mothers received no prenatal care. The incidence of SIDS is highest in families of low socioeconomic status. A higher rate of SIDS occurrence has been observed among infants of mothers who smoke than among infants of mothers who do not smoke. Most SIDS infants die at home in their cribs or carriages.

Services comparable to those provided in the current project areas could be made available for any family affected by a sudden and unexpected infant death. The need to continually assess and improve the quality of services remains a major program objective—utilizing the outcomes and recommendations of the evaluation and toxicology studies, program monitoring activities, and research findings. A longer range objective is to apply research findings in an orderly and timely manner so that ultimately SIDS deaths may be prevented. As the causes associated with or responsible for these deaths are identified, prevention, screening, identification and medical management could become a reality. The importance of preventing prematurity in prevention of SIDS makes this a high priority.

c. Family Development

A family must understand and be motivated to seek periodic health services, particularly for the young infant and child. Critical elements are: timely and complete immunizations; adequate nutrition; early detection of sensory defects; dental care and advice on prevention of caries and other dental defects; early detection of behavioral problems and learning disabilities; early detection of structural, often congenital, defects leading to their repair or amelioration when sequelae are best avoided; and, particularly critical and often difficult in our society, the avoidance of the development of self-destructive habits and attitudes such as smoking, drug abuse, and excessive rebelliousness.

Parents must consider and be aware of their own lifestyles inasmuch as these are models for their children's behavior. Parental attitudes toward smoking, alcohol, and drugs are relevant examples.

d. Reduced Incidence of Unwanted Pregnancies

Fertility surveys indicate that about 1.3 million unplanned births occur annually in the United States. The births persist in spite of accelerated use and effectiveness of contraception, and they threaten the well-being of large numbers of parents and children. For the disadvantaged parent, particularly the teenage mother, the problems associated with an unplanned birth are likely to be severe and long-lasting. Adverse consequences range from social, financial, and medical "inconvenience" to problems which threaten the mother's education, her ability to support herself, and her physical and environmental welfare. The child may be disrupted by the birth.

Of the 1.3 million babies, over 400,000 are born to unwed mothers, about 700,000 are born to married women who, with their husbands, would have prefered to delay the birth, and 200,000 are born to married couples who wanted no more children. Most of the unmarried women involved are teenagers, who are least prepared to care for the child (see also II.K. & L.).

K. & L. ENHANCED GENERAL PHYSICAL AND EMOTIONAL WELL-BEING

1. Nutrition

a. Problem Definition

Most preventable diseases and conditions have been reviewed in strategy targets A–J in some detail. The problem of nutrition, while discussed in the context of a specific area of disease prevention, is an important component of general well-being. Of all the agents affecting man, food is probably the most potent. Its influence extends for the duration of the lifespan, exerting an effect on the course of development as well as the course of specific diseases. Known nutritional requirements are proteins, carbohydrates, fats, minerals, vitamins, and water.

In this country, it is rare to find profound deficiencies in one or more of the above nutrients. It is not uncommon, however, to find borderline deficiencies which manifest themselves at certain periods of life. At those times the effect on the future health of the individual may be significant. These effects are preventable, and can be identified fairly quickly when the population at risk is known.

In the United States, overnutrition is a much more weighty public health problem than undernutrition. In the 1974 Health Interview Survey, 88 million persons aged 17 years and older assessed themselves as overweight. Based on tricep skinfold fat measurement in the 1971–74 Health and Nutrition Examination Survey, 13 percent of males and 22.7 percent of females were classified as obese (*1*).

b. State of Knowledge About Prevention

Infants.—The premature (low-birth-weight) infant, the infant who fails to thrive, and the infant with parental deprivation from whatever cause, are most susceptible to nutritional deficiency. When malnourishment occurs, infants may develop more slowly and may have learning disabilities. The mortality from infectious diseases, such as measles or dysentery, is higher in these infants.

Anemia of infancy is almost invariably due to iron deficiency. It occurs in the premature infant who was denied the iron loading that occurs in the final weeks of pregnancy. It occurs in the "milk baby" whose main source of nourishment continues to be milk far beyond the time solid food containing iron should have been introduced. Only in these specified conditions should iron-fortified milk and solid food be introduced.

Obesity in infancy has recently been suggested to be one of the main contributors to obesity in later life.

Children.—If the child is nutritionally sound in early life, nutritional problems rarely develop until the next stressful period, adolescents, occurs. It is incorrect to attribute anemia in a child 2 to 10 years to malnutrition; again, it is almost always secondary to iron deficiency. Anemia in some instances results in this group from blood loss due to parasitism.

Adolescents.—This is a period of rapid growth and onset of sexual maturity. In boys and girls where there are poor nutritional practices at home and significant indulgence in junk food, their food behavior can lead to obesity, hyperlipidemia, lowered resistence to infection, and decreased growth potential. In girls, this problem is compounded by the onset of menstruation. When borderline or deficient intake of iron is caused by poor nutritional habits, iron deficiency anemia is common. Of particular importance during this period is the high rate of pregnancy in the same populations of adolescents most at risk of being nutritionally deficient (see II-E and II-J). This is a vicious circle, as these pregnancies are at particular risk of prematurity and low-birth-weight infants.

Adults.—Obesity is an extremely common health problem which is based on nutritional imbalance. Obesity is frequently associated with hypertension, coronary heart disease, and adult-onset diabetes. Weight loss or control may protect against these diseases. Prevention may be possible if instituted in childhood, but adult obesity has proven difficult to change in the population as a whole. The adult must be protected from overzealous, unbalanced dieting or treatment of obesity with dangerous drugs.

There is, of course, considerable value to the individual who is able to control weight gain. Less stress on joints and improved self-image are examples of secondary gains.

Elderly.—Borderline nutritional deficiencies may commonly occur among the elderly. These can be a function of poor detention, inability to cook and care for oneself, and lack of money for food.

Prudent dietary practices.—Nutrition education should promote prudent dietary practices, including: Reduction of excess calorie intake, particularly calories from fat; moderate intake of saturated fat and cholesterol; moderate sugar intake, for purposes of weight control and dental health; increased intake of complex carbohydrates; increased use of alternative sources of protein besides red meats—fish, poultry, legumes; moderate use of salt; and prudent use of other additives—e.g., sodium nitrate, refined sugar.

2. Unwanted Fertility/Access to Family Planning Services

a. Problem Definition

While family planning was once discussed only in the context of maternal and infant mortality, it should also be recognized as a health promotion approach which contributes importantly to general well-being.

The number of currently married women aged 15–44 who practice some form of contraception is high, and approached 70 percent of the age group in 1973. Women in the poverty group had the lowest rate of contraceptive use, but even this group was above 60 percent. Oral contraception was the most frequent method in use (36.1 percent of the total) (7).

Unwanted fertility has important implications for well-being. Abortion and out-of-wedlock births are indicators of unwanted fertility. In 1975, there were 854,000 legal abortions—one for every four live births. Teenage girls had a third of these abortions. In 1974, there were 19 out-of-wedlock births for every 1,000 unmarried women between the ages of 15–44.

Some of the outcomes of unwanted births are lower educational achievements, especially for women and for teenage parents, and greater marital instability. There may also be damaging psychological consequences, and perhaps physical abuse, for children unwanted at birth. Childbearing itself is a risk for mother and infant. (*7*).

b. State of Knowledge About Prevention

The following are areas associated with fertility where intervention can help promote well-being, with special emphasis on adolescent pregnancy:

- health care and social services, including: primary postnatal care, family planning programs which emphasize the population at risk, and Medicaid eligibility for pregnant adolescents who are single and childless;
- community-based coordination and gap filling services, such as: linkage of services presently available in communities but not well coordinated, supplemental social services related to sex education, schooling for adolescent parents, nutrition counseling and food, mental health and employment;
- research and training in fertility, male and female contraceptives, fetal health and behavioral sciences;
- education on sexuality and the responsibility of parenting.

3. Exercise

a. Problem Definition

Physical fitness increases muscle tone, aids weight control and energy/calorie intake balance, can help in stress management, and lack of fitness is probably a risk factor for coronary heart disease. Thus, exercise is an important contributor to general well-being.

In 1975, only half of noninstitutionalized adults exercised regularly. The most frequent form of exercise was walking. A significant minority of the population participates in vigorous physical activity—jogging, swimming, tennis, and team sports. Too much emphasis in school on team sports as a form of physical education may not be good, however, since it has limited carryover to adult life as a form of exercise.

b. State of Knowledge About Prevention

While not as thoroughly investigated as other cardiovascular risk factors, substantial evidence from studies suggests that vigorous activity lowers cholesterol and triglycerides, and lowers risk of fatal heart attack (*4*).

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III. STRATEGIES FOR ACTION

Development of an effective comprehensive prevention strategy directed to the health status goals just discussed is a complex undertaking which must accommodate a broad range of activities and decisionmakers, as well as acknowledge a number of constraints. The constraints are many and include most prominently: the difficulty in defining prevention; the lack of a prior emphasis on prevention; the difficulty of measuring the cost-effectiveness of preventive activities and therefore of making the argument for the investment; the absence of a strong constituency for prevention—indeed, to the contrary, the presence of a number of powerful interests to work against many prevention efforts; and the necessity to involve a wide range of public and private sectors to participate in the strengthening of prevention programs.

Even without a precise definition of prevention, measures to keep people healthy may be grouped into three categories, drawn from the three areas which provided the analytic framework for the activities of the Prevention Task Force:

- Lifestyle—health promotion designed for population groups
- Environment—health protection designed for population groups
- Services—preventive health services provided to individuals

This chapter reviews generally the sorts of activities important for each of these categories, notes the settings important to their delivery, and then reviews the strategies to be employed by the Federal Government in ensuring implementation of the activities. The items listed in this section summarize a comprehensive review of the broad range of activities identified by the Task Force as possibilities to be considered by both public and private groups in strengthening disease prevention and health promotion efforts. A more complete listing of the activities is included in the appendixes. While any strategy will have to establish priorities based on the burden of the problem, the practicality of intervention, and the vulnerability of certain target groups, the measures listed do not yet reflect particular priorities discussed in the previous section. Rather, the identification of those specific priorities for HEW action are reserved for the recommendations section.

A. MEASURES NEEDED

1. Health Promotion Designed for Population Groups

Activities designed to help people develop the knowledge, skills, and motivation to make positive decisions concerning health-related behaviors are an important part of a preventive health strategy. Prudent lifestyle choices enable individuals to: avert preventable diseases and conditions; reduce risk factors that may predispose to illness; and promote emotional and physical well-being.

The premises behind these measures are that people are entitled to a genuinely free choice in adopting personal lifestyle, except when that choice (as in all our actions) adversely affects others; that choices are genuinely free only when the individual has effectively been given full information about the decision and the risks attendant to it, as well as the necessary decisionmaking skills to avoid or manage those risks; and that opportunities for individual action should be facilitated and barriers to action lessened.

While some health promotional activities must be provided via intensive and individually tailored counseling to particularly high-risk individuals (discussed under "personal preventive health services"), many can be designed as information packages for population groups of various sizes. Broader school, business and community activities are important to the success of these measures. Increased community support of prevention will speed programs toward the health status goals addressed in this report.

We should not underestimate the potential importance of health education, given the magnitude of the health problems associated with personal habits, but we should be careful not to oversell what it can accomplish. Even in the health field, many professionals have expressed skepticism about its efficacy, and most will agree that we have much to learn about the factors which determine behavior and motivate people to adopt or not to adopt healthful lifestyles. Research is needed to further refine the methodology. Nevertheless, there are appealing new approaches which warrant demonstration and promotion.

These are measures in which HEW has a key role, but ones not by any means limited to the Department. Other Federal, State, local, and voluntary agencies, the health care sector, business and labor, and the individual all have significant contributions to make. The Task Force identified the following behavioral areas which are particularly important to disease prevention and health promotion:

- smoking
- nutrition
- alcohol abuse
- drug abuse
- driving
- exercise
- human sexuality and contraceptive use
- family development

- risk management
- stress management/coping/enhanced self-esteem

a. Smoking

The 1975 HEW report, *The Health Consequences of Smoking,* asserts, "cigarette smoking remains the single largest preventable cause of illness and early death." Important changes in smoking behavior have occurred since the original Surgeon General's Report on Smoking and Health was issued 14 years ago. There are 14 million more ex-smokers today than in 1964, and many smokers have adopted cigarettes with lower tar and nicotine content. A significant minority of the population still smokes, however, and alarming increases have occurred in the percentage of smokers in certain population groups—notably, teenage girls. Some groups, such as certain industrial workers who smoke, and female smokers who also use oral contraceptives, have special risks.

We know more about the health effects of smoking than about behavioral factors associated with smoking. We know that it is easier to help an individual make a decision not to start smoking than it is to help that individual stop. None of the cessation methods in use is universally successful. We need to know more about approaches that work for different smoker groups. Helping young people make decisions not to start smoking is an obvious priority. Some experts believe that it is key to develop ways for young people to confront the smoking decision as a conscious decision, and to equip them with the knowledge and information required to make that decision. There are knowledge development needs in several related areas: predictors to identify individuals and groups likely to decide to smoke; factors associated with the decision to smoke or not to smoke; and effective methods to help adults to quit smoking.

Programs to reduce smoking will have to employ a wide variety of measures: intensive school health education; strengthening of parental models; identification of high risk industrial workers; counseling and peer support activities for school and occupational settings; increased public service announcements on television against smoking; reduction of portrayal of smoking as attractive or pleasurable in television and films; better example by health care providers; communitywide awareness programs; and preservation of the rights of nonsmokers in public places.

b. Nutrition

Prudent dietary practices are a key component of a health-promoting lifestyle. In large measure, we really "are what we eat;" and the Nation's health status indices strongly suggest that the average diet is not what it ought to be. Dietary practices are a mixture of traditional, cultural, and social values, economic and commercial considerations, fads and amusement, and conventional wisdom about what constitutes a proper diet. The very complexity of this list attests to the difficulty of accomplishing a sudden wholesale improvement in the American way of eating. It also indicates that there are numerous areas in which the development of effective interventions should be pursued.

Nutrition has many controversial components. Although we continue to gain new knowledge about nutrition and its relationship to health and the prevention of disease, many important questions either remain entirely unanswered or cannot yet be answered precisely. Despite the limitations of current scientific knowledge, many experts in nutrition believe that sufficient evidence already exists to warrant a shift in current eating habits toward more prudent dietary practices for most people. Such practices include the consumption of more fresh fruits and vegetables and less fat (especially saturated fat), cholesterol, and refined sugars and other carbohydrates. While the short- and long-term impact of more prudent dietary practices on overall morbidity and mortality is not precisely known, there is growing agreement that our present eating habits are a cause for concern. Additionally, if the recent decline in the heart disease death rate can be attributed in part to the lowering of saturated fat and cholesterol consumption, then it is possible that even greater improvements in health may result from other moderate changes in diet.

Persons exhibiting one or more risk factors (e.g., smoking, obesity, and high blood pressure) associated with the major diseases affecting the American population), and persons most likely to develop these risk factors, are important target groups for dietary change. Some promising techniques for assisting individuals to modify dietary practices are emerging from research efforts. Greater emphasis must be placed on devising way to maintain healthful dietary habits over time. Educating children and youth about nutrition and motivating them to eat wisely are recognized as essential to health promotion and disease prevention. Achievement of these objectives will require the counteracting of negative influences including potentially deleterious television advertising to which children are exposed, as well as the strengthening of schools and families as living environments where prudent dietary practices are a matter of course.

Measures useful to promoting better nutrition may be broad-ranged: provision in preschool and school programs of nutrition-related experiences for parents and children; assure nutritional soundness of school lunch programs; educate teachers on identification of weight abnormalities in children; strengthen nutrition's role in school health education; provide nutrition instruction in work facilities and cafeterias; self-instructional materials for use in the home; improved access by the elderly to food supplement programs; provision of nutrition-related information in grocery stores; more television and radio public service announcements on nutrition; improved training of health professionals on the role of nutrition in wellness and illness; encourage restaurants to offer nutritious fare; encourage commercial manufacturers to produce nutritious products and employ lucid labels; and stimulus of community-wide awareness programs in nutrition.

c. Alcohol Use

Alcohol abuse prevention is intended to minimize social and health problems—affecting well over 10 million people—relating to alcohol use and abuse. Alcohol use and abuse is on the increase in young people—

even as young as 8—and has become the "preferred substance of abuse" in this age group in many parts of the country. The health consequences of alcohol abuse are profound. It is the principal cause of 2 of the 10 leading causes of death in the country (motor vehicle accidents and cirrhosis) and a contributor to others.

In addition, there are more than 48 million women of childbearing age (15–44) in the United States. Many of these women who become mothers run the risk of delivering a child who will be born with a physical or mental impairment because of the mother's excessive consumption of alcohol. Approximately 1 in 2,000 babies is at risk of developing fetal alcohol syndrome (FAS) should the mother consume six drinks or more a day.

Major objectives of prevention initiatives include the reduction of destructive behavior associated with alcohol use and abuse for the whole population, with special emphasis on adolescents (i.e., reduction of overdose deaths, arrests for driving while intoxicated, and other encounters with the law), family and social disruption, and alcohol/drug related accidents.

Surveys conducted through the National Runaway Program indicate that a significant percentage (2.3 percent) of youth seeking assistance have an alcohol-related problem. A major focus for the prevention of alcohol abuse must be to increase awareness and raise the consciousness about alcohol, its effects, and hazardous practices related to its use, especially by 8- to 18-year-olds. Techniques must be developed to reach these specific target audiences, including the mobilization of peer influences, sports and entertainment personalities and other role models (as well as efforts to influence alcoholic beverage producers not to use such persons to glamorize alcohol consumption to young people), and the national public education programs in the Nation's schools and social organizations targeted to youth. These activities must be carefully evaluated, so that the most effective techniques can be more broadly implemented.

Measures important to preventing the consequences of alcohol abuse include: efforts to identify children of alcoholics, or otherwise at high risk; emphasis on alcohol in comprehensive preschool and school health education curricula; development of peer leadership models; establishment of alcoholism prevention programs at the worksite; improved role of parents as models; increased public service announcements on television and radio; better programming on television and radio to portray the drawbacks of alcohol use; strengthened referral skills among social and health agencies dealing with high risk populations; and communication through labeling and the media of the risks of FAS for pregnant women.

d. Habituating Drug Use

The profile of the millions of Americans placing themselves at risk through drug use abuse has been reviewed in the previous chapter. Prevention initiatives related to habituating use of legal drugs, commonly available substances such as caffeine, as well as nicotine and alcohol (which are treated separately), and illegal drugs, focus on reducing the number of new users of habituating drugs, delaying first use of such drugs, and reducing multiple drug use and frequent or daily use. Special efforts are needed to reduce such destructive behavior as overdose and overdose deaths, arrests for driving while intoxicated, and other encounters with the law, family and social disruption, and drug/alcohol related accidents and violence.

Promising targets for prevention include young people not yet using drugs or just experimenting with psychoactive substances. Efforts to reinforce a drug-free experience and increase awareness of the hazards and interactive effects of habituating drugs must focus on the family, peer groups, and the school, as well as the church, media and community institutions and public service organizations, recreational activities, and the criminal justice system. Improved methods are needed to identify target populations and to evaluate such existing and developing preventive interventions as: (1) projects that design and use new techniques which clearly document population targeting, program impact, and cost effectiveness; (2) research designed to examine the psychosocial process leading to different lifestyle commitments regarding use; (3) research on self-help groups; (4) research on positive substitute behaviors (e.g., exercise) as a prevention strategy; and (5) long-term research on maintenance of behavior change and factors affecting such maintenance.

Measures important to preventing the consequences of drug abuse include: strengthening the role of peer group interaction in drug education programs; developing better school and preschool health educational curricula; developing corporate drug abuse prevention programs for employees and their families; improving the national multimedia efforts focused on populations at risk; promoting greater participation of national and local youth-serving agencies for community programs; and encouraging providers to take a more thorough drug history and to employ more responsible prescribing practices.

e. Driving

In 1975, motor vehicle accidents were the third leading cause of potential years of life lost for Americans aged 1–74 years. More young persons (15–24 years) die in motor vehicle accidents than from any other cause. Hundreds of thousands more are injured, many for life.

These data compel us to identify driving as a separate behavior. At least four behavioral elements seem to be involved. Driving while intoxicated is an obvious problem. Some single-car accidents may be car suicides. Failure to drive defensively—i.e., to anticipate and avoid hazardous driving events which one could not control—needs to be understood better. Finally, it is hard to avoid the idea that personality traits bearing on aggressiveness and risk-taking seem to be reinforced behind the steering wheel. The reliance of Americans on the automobile, and the amount of time spent driving cars, make driving a key behavior with significant health effects.

Efforts to reduce motor vehicle accidents may include: stronger enforcement of traffic laws; better roadway design; safer vehicular design; capitalizing on children's interests in cars by emphasizing being a safe passenger, increased awareness in health education programs of accidents as the primary health problem of the young; emphasis on the link between alcohol/drug use and accidents; including driver safety in health hazard appraisal queries; work with media to discourage sensational "car chase" scenes; and encouraging use of media to promote safe driving habits.

f. Exercise

For large numbers of Americans the ordinary tasks of living no longer provide enough vigorous exercise to develop and maintain good muscle tone or cardiovascular or respiratory fitness. Homes, factories, even farms, now contain numerous labor-saving devices for jobs which once demanded physical activity. Walking long distances and climbing stairs have virtually been eliminated from daily life. Even in recreation, the influence of television has reduced the stimulus to plan in physically active ways. Children sit in captive idleness for countless hours of their playtime, watching TV.

We know that 45 percent of American adults never engage in meaningful physical activity or exercise; and, of the 55 percent who do, most do not meet the minimum time recommendations of medical authorities. This pervasive inactivity, together with poor living habits, has resulted in a serious national fitness problem. Obesity is one obvious concomitant, as are diseases of the heart and blood vessels.

In recent years, however, dramatic changes have occurred in our fitness attitudes and practices. It is estimated that there are 7 million joggers, 15 million regular cyclists, and 15 million serious swimmers among America's adult population. Despite the current popularity of physical fitness, an information gap persists. Most Americans associate fitness with athletic performance, rather than with good health, improved appearance, or better job or school performance. This is especially true among people who are poor, elderly, or not well educated.

Activities to promote exercise include: development of community fitness trails and bicycle laws; emphasizing exercises which do not place such a premium on coordination and competition; identification of programs which facilitate optimum psychomotor development of pre-school children; extending school facilities to out-of-school populations; encouraging employee fitness programs; increased public information efforts on exercise through use of media and civic organizations.

g. Human Sexuality/Contraceptive Use

Major efforts in the fields of family planning and teenage pregnancy undertaken by the Federal Government recently are grounded in the concept of individual awareness of sexuality, the need to explore sexual roles in the society, and the need for responsible decisionmaking.

The determination of the family unit is perhaps the most important societal decision made by a pair of individuals. Knowledge about how to plan and provide for a family is a skill, although it receives little emphasis in our society. Teaching of appropriate parenting skills also requires but does not always receive sufficient attention.

In addition, sexually transmitted diseases provide an increasing threat to the health and well-being of millions of young Americans. While syphilis is declining, gonorrhea and herpes continue to hold potentially serious long-term complications not as yet fully understood.

Programs to prevent problems attendant to human sexuality include: improved school and preschool instruction on reproductive psychology and physiology; dissemination of information on contraceptives and their availability; pregnancy and abortion alternative counseling in schools; worksite information and counseling on reproduction, contraception and sexually transmitted diseases; instruction on the parental role in decisionmaking about family development and sexual behavior; media programs emphasizing responsible sexual behavior; improved referral linkages between health and social service agencies; development of programs on human sexuality by youth organizations and centers; and improved capabilities of primary health care personnel to deal with problems of human sexuality and sexually transmitted diseases.

h. Family Development

Prevention and health promotion activities recognize the importance of nurturing processes and the interdependence of family members, and the way in which external community support systems that strengthen internal relationships can increase the possibility for each family member to achieve his optimal human potential. Special support systems designed to meet the needs of the traditional family (mother, father, and children) as well as other family units such as the single parent, childless couples, and single adults who adopt family patterns, could help relieve the kind of family stress that may be related to illness, and contribute directly to individual "wellness." Some of these support activities can include programs related to improving family interpersonal skills, child rearing practices, decisionmaking skills to cope with societal pressures, programs for "life planning," quality day care, and personal responsibility for health maintenance.

The large number of potential measures to enhance family development include: accessibility and utilization of day-care and preschool facilities; ensurance that preschool programs provide healthy environments and adequate nutrition; strengthened health promotion and parent education components to preschool and school programs; education of teachers in the identification of childhood distress or crises; inclusion of parenting education in school curricula; training of personnel officers to be alert to behavior changes and to be aware of referral sources; provision of information on occupational risks; inclusion of parenting education on television and radio, with community followup; provision of family access to the hospitalized patient; provision of home care where possible; development of support systems for single parent families; and identification of group problemsolving strategies for families.

i. Risk Management

Managing one's risks is a health behavior which includes awareness of risk, appropriate decisionmaking, and knowledge of self-protective practices. Health risk appraisal, an integral component of any risk management program, attempts to identify individuals at risk of premature death and disease due to factors such as cardiovascular disease, cancer, or mental dysfunction.

The appraisals are based on risk indicators—characteristics, traits, or behaviors that modify individual susceptibility to disease or death. The degree which these indicators affect risk of disease or death is quantitatively expressed. Risk reduction programs are designed to minimize these risks by providing individuals with information and strategies to help them modify the behaviors that could adversely affect their health.

Limited by the availability of epidemiologic data and adequate instruments and technology, most forms of health risk assessment use quantitative risks of mortality only, and cover about 80 percent of all causes of death. Typically, the appraisal is made by a questionnaire and batch-processed by a computer. More recent forms incorporate mortality risk assessment using current vital statistics, morbidity risks for cardiovascular disease and cancer, mental status (risk) assessment and health beliefs and practices characterization. They are administered by user-controlled interactive computers and allow for self-selection of risk reduction strategies.

The growing development of programs using some form of health risk appraisal and educational/behavioral and other risk reduction strategies highlights the need for research and evaluation of efforts in these areas to provide the base of empirical evidence so badly needed in health promotion.

In certain respects, risk management is a key element of programs designed to affect other health related behaviors (e.g., smoking, substance abuse, and nutrition). Risk management itself, however, is an identifiable behavioral target and an important element of a comprehensive lifestyle strategy.

Measures to enhance risk management include: teaching the concept of risk in preschool and school health curricula, including the role of personal behavior; development of instruments to assess personal risk which may be used in a variety of settings—preschool, school, workplace, health care delivery; development of school-based risk reduction programs such as those on smoking, flossing, exercise, diet, and substance abuse; promotion of risk assessment and risk reduction in the home; use of the media to heighten awareness of health risks; training of health professionals in use of risk assessment for patients; and encouraging health care systems to support the concept of self-care, including the provision of support services.

j. Stress Management, Coping/Adaptation, Enhanced Self-Esteem

The enhancement of individual coping and adaptive skills usually results in better stress management, increased self-esteem, and a better sense of competency.

Such studies as the Stanford Heart Disease Prevention Program demonstrate that the adoption of specific health habits (e.g., a regular program of exercise) also seems to result in improved coping/stress management.

In addition, changes in one health behavior correlate positively with changes in related health behaviors.

Stress is thought to be related to such unhealthful life practices as overeating, substance abuse, and poor personal relationships. Improving stress management skills may help individuals change specific health behaviors (e.g., smoking).

A large number of activities may be employed to improve coping and stress management skills, including: improving the ability of preschool and school staff to identify maladaptive coping patterns (such as withdrawal or frequent temper tantrums); inclusion in health education curricula of materials on coping with life crises such as death, parental separation and divorce, and disasters; wide dissemination of materials on suicide prevention; development of programs at the worksite which enhance the ability to cope with stress (exercise, and relaxation training); provision of parenting education at the worksite; provision of preretirement planning for employees; development of part-time work situations; establishment of employee wellness programs; training of medical care personnel to identify distress and refer appropriately; development of social networks to support the elderly and decrease isolation; and community support systems for persons experiencing marital separation/divorce, bereavement, natural disasters, and other forms of separation, loss or crisis.

2. Health Protection Designed for Population Groups

Promoting the development of healthier lifestyles for people is perhaps the most important component of disease prevention, but people cannot reduce all risks through voluntary or better informed action. There are in addition a number of measures which must be taken to protect people from hazards which have the potential to make their way into food, air, water, the workplace and other components of the environment in which we live. Health protection activities include those directed at identifying causes of health risk, those to determine the populations at risk early in their exposure, and those to intervene to reduce the risk of exposed groups.

Our environment is one fraught with hazards. The growth in the use of synthetic chemicals in the last 25 years has been phenomenal. There are now almost 2 million recognized chemical compounds, and over 30,000 of these are commercially produced. One thousand new compounds are introduced each year. We will be well into the 21st century before we know the effects of a lifetime of exposure to these chemicals.

The combination of health hazards attendant to certain of these compounds, as well as other safety hazards in the workplace, generates about 400,000 new cases of occupationally related illness in the United States each year. Furthermore, there are over 100,000 annual deaths related to the workplace. Clusters of illness are occurring not only in worksites, but around them, in surrounding communities, as well. The Interagency Regulatory Liaison Group notes six important categories of health problems attributed to environmental toxins: (1) reproductive and developmental toxicity; (2) mutagenesis (particularly chromosomal mutation and single dominant gene mutation); (3) carcinogenesis; (4) chronic degenerative diseases (including arteriosclerosis, ischemic heart disease and other cardiac conditions, hypertension, emphysema and others); (5) neurological and behavioral toxicity; and (6) immunologic diseases. More than 25 agents are known to cause birth defects. The mechanisms of action of environmental agents are not necessarily disease-specific, nor are there yet established firm cause-and-effect relationships (or even associations) for many potential problems. But government has an obligation to make sure that agricultural and industrial production processes do not present our citizens with unreasonable risk.

Congress has recognized this obligation with the passage of the Occupational Safety and Health Act, the National Cancer Act, and the Toxic Substances Control Act. Not all such measures are restrictive in nature. For example, fluoridation of water supplies is a positive step which can protect millions of Americans against dental disease. Likewise, immunizations, while a personal preventive health service, protect populations from the scourage of many infectious diseases.

Most health protection measures do, however, require regulatory oversight. Regulations and enforcement can be effective mechanisms to secure protection of the public. Regulation can require certain standards to be met (occupational health, food, drugs) or certain processes to be followed (clinical laboratory quality control). Maximum exposure levels to substances (carcinogens) and limits on the sale or use of products (amphetamines) can be imposed to qualify for Federal funds. A variety of actions by grants can be required (health education in HMO's).

Regulation is usually controversial. There are costs to be borne which are often easier to quantify than the benefits produced. The public often reacts unfavorably to limitations on sale of desired substances. Prohibition in the 1930's, despite being a public health success (it lowered the prevalence of heavy drinkers and the cirrhosis rate), proved an unacceptable social policy. More recently, the saccharin issue provoked heated public reaction. Hence, regulation must be pursued cautiously, with careful consensus building. Nevertheless, it is a significant strategy element, especially when applied to environmental issues.

Regulation to "require" health promotion is obviously unacceptable, however, regulation which in effect assists individuals to undertake health promotion activities and health behavior change may be quite useful. Regulations requiring nutrition labeling, for example, may have little or no effect by themselves, but may have very beneficial effects when coupled with health education and information programs for consumers (e.g., FDA's nutrition project).

Health protection measures designed for population groups may be discussed according to several types of potential sources of exposure to prominent hazards:

- air
- water
- food

- drugs
- motor vehicles
- guns
- physical hazards

a. Air

Contamination of the air has been acknowledged as a serious threat to human health for many years. Inversion patterns resulting in stagnant air and causing build-up of pollutant levels to yield dramatic rises in morbidity and mortality have occurred in several countries. The effects of longer term lower level exposures are still being studied but are likely to be dramatic. As noted in section II, in 1975 an estimated 18 million tons of particulate matter, 32.9 millions of sulfur oxides, 24.2 million tons of nitrogen oxides, 30.9 million tons of hydrocarbons, and 96.2 million tons of carbon monoxide were emitted into the Nation's air. It is possible that 33 to 34 million people are at risk of being adversely affected by exposure to air pollutants because of age or underlying disease.

Even very localized pollution due to cigarette smoking can exacerbate problems related to allergies, respiratory disease, or cardiovascular disease. A number of health protection measures can be important to reduced air pollution, including: increased testing to identify air pollutant hazards; establishment and enforcement of ambient air quality standards for known hazards; requirement of pollution control measures for industries and motor vehicles; provision of safety education to workers; assurance of a smoke-free workplace for vulnerable workers; preservation of smoke-free environments in public places and on public transportation; and restriction of smoking in certain hazardous work settings.

b. Water

With the growth in the availability and use of chemicals in manufacturing processes over the last quarter of a century, the Nation's water supplies became dumping grounds for wastes from those processes and the results have occasionally been disastrous. While there are now substantially fewer dangers in this country from water supplies contaminated by bacteria, the dangers of contamination from oil, fuel and other organic halogens are much more real. Measures can be employed to: improve identification of water pollution hazards; establish and enforce water quality standards; require pollution control devices for industries and ships; and develop improved sewage disposal techniques in certain areas.

c. Food

Protection of the Nation's food supplies is one of the most important health protection activities. In the process of growing, fertilizing, harvesting, processing, and storage, food is subjected to contaminants from the air, the water, pesticides, and spoilage. Health problems related to food contamination have ranged from acute illness of bacterial infections, to chronic, debilitating central nervous system disease. Food contaminants have even found their way into newborn infants through mothers' breast milk. Food processing can yield hazards in the form of unintended contaminants, unsafe food additives, or use of hazardous food packaging materials. Furthermore, consumption of certain foods and nutrients may lead to health problems if used in excess—e.g., saturated fat, salt, and vitamins A and D. Protective measures related to food include: close inspection of food processing, packaging, and marketing procedures; identification of presence and hazards of pesticide residues and food additives; control over packaging to preclude harmful unit dosages; clear labeling to inform the consumer of potential hazards; changes in meat grading processes to give a higher grade to beef with lower fat content; and early identification and counseling for people who appear to be poorly nourished—including education of school and preschool staff in the identification of these problems.

d. Drugs

There are today some 53,000 prescription pharmaceuticals (with 2,000 separate ingredients) on the market, and at least another 230,000 "over-the-counter" preparations. Each year an estimated 70 to 80 new prescription pharmaceuticals are introduced. In 1977, $12.5 billion were expended to fill 1.4 billion prescriptions. In that same period of time, there were an estimated 13,900 adverse reactions to drugs, including 611 drug-related deaths. The potential for adverse reactions to these often powerful drugs, coupled with their volume and frequency of use, compels a strong program to protect the users from unintended health consequences. The necessary measures include activities to insure: the safety and efficacy of the drugs; the purity of their preparation; the appropriateness of their use and the rate at which they are prescribed; the accuracy of the claims made for them in advertising; the legitimacy of their marketing; the utility of their labels; and an adequate level of consumer understanding of their effects.

e. Motor Vehicles

In 1975, 45,000 people died on American roadways. Driving behavior was noted as one of the important health goals in the effort to reduce morbidity and mortality. But driving behavior is only one component of measures which can be taken to reduce traffic injuries and deaths. Measures can also be taken to protect the safety of drivers, including: careful study and implementation of highway design to reduce the probability of serious accidents; promotion of safer automobile design and construction; development of functional automobile safety equipment (e.g., airbags, seatbelts, and cushioned bumpers); identification of safer traffic patterns, such as separation of trucks, cars, and bicycles; and stricter enforcement of speed laws.

f. Guns

The careless and criminal use of guns in this country poses a significant public health hazard. In 1977 there were approximately 2,000 accidental deaths caused by firearms in this country and another 20,000 accidental injuries. For millions who keep a loaded gun in the house for protection, there is an estimated sixfold greater probability that it will result in the accidental death of a family member than it will be used to save the life of a family member against an intruder.

In addition, in 1976 there were 19,554 homicides in the United States, of which almost two-thirds were due to firearms. Homicide is by far the most important cause of death for young black males. In 1976, there were 77 homicides per 100,000 population among 15- to 24-year-old black males—a rate seven times that for their white counterparts. Many of these deaths could have been prevented if stricter controls were in place to protect against the misuse of firearms.

g. Physical Hazards

There are a broad range of potential physical hazards in working and living environments which require protective standards. Visible and invisible, these hazards range from microwave radiation exposure, to structural deficiencies in the construction of a home or workplace, to hazardous chemicals in solvents used for cleaning. The injuries caused may be acute and traumatic or chronic and debilitating. They may be caused by mere presence in the environment, or by the careless use of a product. The Consumer Product Safety Commission estimates that product-related accidents caused an estimated 30,000 deaths in 1976 and another 37 million injuries. Measures may be employed at many steps to protect against these injuries and deaths: in product design, in engineering standards, in the education of those developing the designs and standards, in construction or packaging, in the instruction given the operators of machinery, in the information provided the user or consumer, in the testing, in the development of protective devices, and in inspection to insure safety prior to marketing or during operation.

3. Preventive Health Services Provided To Individuals

In addition to health promotion and health protection activities which are designed for population groups, there are a number of health services which can be provided to individuals to facilitate disease prevention and health promotion. These services include: protective services such as immunizations; fluoride rinses; pre- and post-natal care; screening services aimed at early detection of hypertension, diabetes, cancer, cardiovascular disease, sexually transmitted diseases, vision and hearing problems, lead poisoning, and congenital disease; and counseling services to assist individuals with respect to nutrition, smoking behavior, alcohol use, genetic diseases, and family planning, among others.

While these personal health services have traditionally been associated with formal medical treatment settings, they can also be delivered in schools, worksites, the home and other community settings and by a variety of health personnel. Physicians, dentists, nurse practitioners, dietitians, counselors and many others are important to the delivery of preventive health services to individuals.

There is general agreement that the pregnant woman and fetus and the very young child should be a primary target of any preventive initiative. Prevention of genetic disease is an appropriate component of family planning. A prenatal examination would include a physical examination, various laboratory examinations, medical and family history, and a genetic history. Screening, diagnosis, counseling and backup services with respect to that 6 percent of the population affected by genetic disease is an appropriate service to prevent some of the effects of undetected disease. Guidance with respect to self-care during pregnancy—nutrition, physical activity and exercise, use of tobacco and alcohol—and care of the newborn is an important preventive service which is not necessarily the exclusive province of the physician.

A common reflection on the difficulty of marketing prevention is that it is best promoted and most cost effective for the individual who is attached to a provider. The provider then has some stake in the outcome, either professional or financial. This implies that Federal influence on the delivery of preventive services may be greatest when targeted through grants or through capitation or "at risk" arrangements.

Schools remain a promising setting for screening, diagnosis, counseling, basic health and nutrition education, and the more aggressive intervention in dental health, accident prevention, mental health and risk identification. For the nonschool population, much can be done in the workplace and through the media, but the most appropriate place for a continuous record and reinforcement of healthful practices is a medical treatment setting: a Community Health Center, a physician's office, an HMO, a hospital outpatient clinic, or a group practice.

To assist the Department's Prevention Task Force in the services area, the Institute of Medicine was asked to convene an *ad hoc* advisory group on preventive services to develop recommendations on the nature and scheduling of key preventive services. Ten life periods were identified by the advisory group, and recommendations tailored to each:

(a) Pregnant women and fetus (including: history; physical exam; counseling; and lab exam for VDRL, hemoglobin/hemotocrit, urine sugar and protein, RH determination, blood group determination and rubella HAI titre).

(b) Normal infant (including: physical exam for deformities; silver nitrate prophylaxis; screening for abnormalities related to PKU, thyroxin, vitamin K; immunizations; and counseling).

(c) Pre-school child (including: history; physical exam with screening for vision, hearing, and speech problems; immunizations; and counseling).

(d) Schoolchild, aged 6–11 (including: history; physical exam; and counseling).

(e) Adolescent, aged 12–17 (including: history; physical exam; lab exam for serum cholesterol; immunizations; contraceptive services; and counseling).

(f) Adult entry, aged 18–24 (including: history; physical exam; contraceptive services; counseling; and lab exams, particularly papanicolaou smear, gonococcal culture, and rubella titres for women).

(g) Young adult years, aged 25–39 (including: history; physical exam; lab exam; contraception; and counseling).
(h) Middle adult years, aged 40–59 (including: history; physical exam with baseline EKG and rectal exam; lab exam with stool guaiac and serum cholesterol; and counseling).
(i) Older adults, aged 60–74 (including: history; physical exam; influenza immunization, as required; and counseling).
(j) Old age, over 75 (including: history; physical exam; lab exam; influenza immunization, as required; and counseling).

The recommended frequency at which these services are to be offered was also noted. The complete report and recommendations of this advisory group is noted in the appendixes.

B. TARGET SETTINGS

To fashion effective prevention strategies it is essential to develop cross-cutting activities targeted to different settings. Unlike therapeutic care—which is both very problem- or complaint-specific, and confined largely to the medical treatment setting (e.g., hospitals and doctors offices)—disease prevention and health promotion activities ought to be tailored to coordinated delivery in the many settings in which people live and work. The settings which offer the best access to people include:

- preschool setting
- school setting
- occupational setting
- home (including television and radio)
- medical treatment setting
- community

1. Preschool Setting

The health care needs of children and their health education cannot wait until the child enters school at the age of 6. A variety of approaches can be used to reach the increasing number of children being placed in organized preschool settings by their working mothers. The great majority of these children are in "family care" situations, that is, care provided to a number of children by a mother in the neighborhood. Many children are also in formal preschool settings: day care centers, nursery and play schools, Head Start programs, and other similar programs. In 1977, approximately 900,000 children attended about 18,300 licensed day care centers and about 284,000 children were in 81,000 licensed family day care homes. An additional 6 million children, both preschoolers and school-age children, were placed in some type of "substitute" or after school care for up to 10 hours per week. Important health education can be carried out in these programs to influence the development of healthy habits at early stages. In addition, preschool settings provide excellent opportunities to inform parents of preschoolers about the need for protection against childhood diseases and early detection of health problems to prevent future disability. Essential services include: immunizations, vision and hearing screening, screening for lead poisoning for high risk children, and evaluation of individual growth and development.

2. School Setting

The adaptation to the profound biological and psychological changes that occur during childhood and early adolescence affect the physical and emotional development of the child. Activities which promote a positive response to developmental changes will depend in part on effective health education which equips the adolescent on several levels—cognitive, emotional, and interpersonal. During adolescence, many health-related behavior patterns are set such as smoking, drug and alcohol use, sexual activity, and driving. Schools, where more than 40 million children and youth spend most of their day, provide an accessible setting for health education through formal curriculum units, extracurricular activities, peer counseling and other approaches. Delivery of services in the school setting, in conjunction with health education, could strengthen an overall health promotion approach—e.g., smoking cessation and weight control clinics. The needs of sexually active teenagers are especially great. They require information on human reproduction, physiology and sexuality, contraception and the availability of contraceptives. Pregnant teenagers should know about the effects of smoking and alcohol on the fetus; the need for prenatal care and where to get it; parenting skills; and about counseling on adoption, abortion, and other options she may be considering.

Much is already being done to develop school health educational models. Noteworthy are the School Health Curriculum Project (Bureau of Health Education—CDC), the Seattle Model (Bureau of Health Education and the American Lung Association), the Know Your Body Program (American Health Foundation and National Cancer Institute), and the Child Initiated Actions for Health (UCLA Medical School). But a comprehensive health promotion effort has not been instituted in the schools. This effort should have a prominent focus in the U.S. Office of Education, and ought to include consideration not only of health education, but also the delivery of certain preventive health services similar to those noted above for the preschool setting.

3. Occupational Setting

Broad workplace programs in health information, education, and promotion are promising for a number of reasons. A labor force of 85–90 million persons, mostly well (or at least not seeking medical attention), are daily brought together in a variety of occupational settings, many of which are conducive to prevention programs. Several factors support this as a logical program setting:

- specific health risks (including stress) are associated with occupations;

- social reinforcement is available from peer group involvement in the program;
- work plays a major role in daily life, integral to well-being;
- involving workers in health promotion programs provides a channel to involve the home and family unit as well.

A number of programs exist in business and industry which can serve as prototypes—including comprehensive occupational health programs, worker preventive medicine programs, or specific programs such as worker alcohol abuse and hypertension programs. Health motivators from worker ranks may provide important guidance.

An interesting means of consolidating many of the health promotion, health protection, and personal preventive health services programs for the employee, is the provision of an employee "wellness program" for the worksite. Such a program would include employee education and services related to fitness, health risk appraisal, counseling and screening.

4. Home Setting

While much of the health information and education which is applicable to home and family needs is covered by the "family development" rubric discussed earlier under health promotion, it seems essential to direct attention specifically to the resources of the home setting in the development of, and choices about, health-related behavior. Demographic and other social trends have had a pronounced effect on the family, with potential effect on family health. Increases in working mothers, in single-parent households and female-headed households, the high divorce rate, the increasing elderly population, and large increases in people living alone, are just a few of the factors bearing on family structure and family health. This report accepts the premise that healthy family structure should be sought, and that health promotion efforts based in the home should be pursued, where feasible.

Particular attention ought to be paid to the role of the media as an influence in the home setting. Experience has shown that use of mass media can both promote and impede healthful behavior. When used positively, they can be particularly effective for alerting people who are in high risk groups. Since only one or two new thoughts may be conveyed at a time using television and radio messages, telecommunication is one educational mechanism in which many health issues may be treated separately. A comprehensive effort could be achieved, however, through the production of a carefully planned, integrated series of public service announcements relating a variety of health issues. This could be done by developing (1) media-oriented educational strategies which create interest in individual health protection and community oriented action, (2) materials to support these strategies, and (3) methods to ensure the effectiveness of the messages.

Messages ought to be tailored for various age, ethnic and socio-economic segments of the population, with particular emphasis on young or high risk groups. Campaigns should be adaptable for local community concerns as well as those that are more general. They can be directed to health promotion, health protection, and encouraging prudent use of preventive services.

Media channels are extremely varied in form, audience, and ability to target. They include private and public broadcasting (radio and television), cable TV, newspapers and magazines, video disc and other audiovisuals, and a multitude of advertising channels. The challenge is to use media as effectively and creatively as those who use it in ways that promote unhealthful behaviors, at a fraction of the expenditure for the latter.

5. Medical Treatment Setting

Medical treatment settings may be the most obvious, yet the least used, setting for preventive measures. Not only are personal preventive health services too often considered as afterthoughts and carelessly applied, but efforts at instructing on health promotion and health protection may be overlooked completely. Improving the extent to which medical care providers can be employed for these activities will depend in large part on changes in the way they are trained.

Medical care providers are in a unique position to provide information to patients about smoking, nutrition, alcohol and drug abuse, exercise, and other health promotional concepts. In addition, providers ought to take detailed occupational and family histories, and instruct parents on potential occupational and environmental hazards. Professional associations can be encouraged to support this concept. Furthermore, health information and education activities in the medical treatment setting can be employed to improve the use of services in preventing disease. Patient compliance with therapeutic regimens in chronic diseases is most important and can be improved through increased emphasis in this setting. Information on the appropriate use of screening services ought to be provided routinely.

Interesting concepts to further develop which cut across all of the lifestyle sectors are: (1) increased employment in the health care delivery system of a formal health hazard appraisal instrument; (2) use of the "behavioral contract"—a behavioral change contract the patient makes with himself and the provider; and (3) use of physicians' assistants, nurse practitioners, and paraprofessionals in identifying health problems related to lifestyle and counseling patients on remedial activities.

6. Community Setting

The community provides a setting which, when organized and capably led, can involve large numbers of people in disease prevention and health promotion activities. The official health agencies constitute a resource to stimulate and support community activities. Community-oriented organizations are effective channels for education—examples include PTA's, commercial, social, charitable, and civic groups, religious organizations, and minority-group organizations. Voluntary organizations often have local chapters and affiliates, as do associations of health professionals.

Initial steps toward achieving community involvement would include: (1) Departmental cooperation on the Federal level with national officials of community-oriented organizations and (2) support for local health departments and HSA's to encourage establishment of working relationships between those organizations and community leaders.

Community activities related to the provision of services for immunization, hypertension, sexually transmitted diseases, prenatal care, and others are all important prevention efforts. In addition, and perhaps even more important, measures such as zoning, sanitation regulations, waste disposal, water purification and fluoridation restrictions, road design, traffic law enforcement, television and radio licensure, and park and recreation policy are key components of a comprehensive health protection and health promotion program. The community provides an essential vehicle for this work.

C. FEDERAL RESPONSIBILITY FOR DISEASE PREVENTION AND HEALTH PROMOTION

Principal responsibility for most prevention activities must lie with the private businesses, organizations, and individuals with the greatest direct control over the major factors contributing to preventable disease. American business and industry has the ability to provide protective measures for employees exposed to worksite dangers, to promote employee fitness and wellness programs, and to safeguard the public's health and safety through careful control of manufacturing processes and products. Similarly, American labor unions, whose 20 million members represent over 20 percent of the total work force, can do a great deal both to provide prevention information to union membership and to encourage management's provision of health protection and health promotion programs at the worksite. Private medical practitioners can promote the delivery of preventive services and health education in their offices. The insurance industry can provide important incentives to prevention programs by offering reimbursement for preventive services, as well as preferential rates to employee or population groups with healthier lifestyles, better protective measures, or proven safety records. The communications industry can offer the powerful tools of television, radio, newspapers and magazines in promoting awareness of prevention activities through public service advertisements, feature presentations, responsible reporting, and routine programming. Voluntary organizations can mobilize large numbers of people as well as substantial financial resources to help expand disease prevention and health promotion activities.

Clearly, the major foci for prevention efforts lie outside the Federal sector, and yet the Federal Government can be tremendously important to stimulating the development and implementation of many elements of a prevention strategy. The components of the Federal responsibility in disease prevention and health promotion may be grouped as follows:

- direct and indirect delivery of personal preventive health services
- strengthening non-Federal sector capabilities

- determination and enforcement of health and safety standards
- manpower development
- provision of economic incentives
- provision of leadership and coordination
- expansion of the knowledge base (research, data collection and cost-benefit analyses)

In the discussion of these strategy elements, *no attempt has been made to identify priorities* from the samples presented. That exercise is reserved for the recommendations section.

1. Direct and Indirect Delivery of Personal Preventive Health Services

The nature and importance of personal preventive health services was discussed earlier in this chapter. There are three general ways in which the Federal Government can directly or indirectly provide personal preventive health services: (1) through Federal reimbursement for individual preventive services; (2) through the delivery of preventive service modules in group health care settings; and (3) through the establishment of special preventive health service programs for certain types of problems.

a. Federal Reimbursement for Personal Preventive Health Services

Federal reimbursement for preventive health services could be effected either under Medicare and Medicaid or under a comprehensive national health insurance program. Assuming little immediate change in the current delivery system, payment methods will closely parallel the setting in which services are delivered. That is, inclusion of a preventive service in a general reimbursement package means fee-for-service physicians will be the major providers. Limiting insurance coverage of a service to organized settings has obvious consequences, as does paying for a service directly or through service-specific grant programs. General reimbursement would make preventive services available to the greatest number of people, however, neither public financing nor private insurance has tended to emphasize preventive care in the past. Thus there is little knowledge on which to base reimbursement decisions. The following problems should be carefully considered in covering preventive services:

- there is considerable disagreement as to which services are effective;
- preventive care must occur at regular intervals in order to be effective. A system that simply pays bills encourages provision of preventive care but does not ensure appropriate use of such services;
- because of difficulties in defining prevention or monitoring fee-for-service physicians, indiscriminate coverage of all preventive care may invite some provider abuse and raise costs unnecessarily;
- failure to contain the costs of reimbursing for preventive care may adversely affect funding for preventive services that are more efficiently provided. This is part of the larger problem of grant programs being squeezed by entitlement programs.

A number of options for reimbursement of preventive care have been suggested:

- *Unlimited coverage of preventive care.*—This approach would encourage wide provider participation but would entail all the problems listed above.
- *Vouchers for a dollar-specific amount of preventive care.*—This approach would contain costs, however, the content of the preventive care package would not be specified and appropriate regular use by individuals would not be ensured.
- *A "health monitoring" package that specifies services, age and sex of recipients, and intervals for delivery.*—This would deal with many of the problems listed above, especially if coverage were also dollar limited, however, responsibility for appropriate regular use would still lie with the consumer. Moreover, if this approach is followed, it would take a major effort to reach agreement on a cost-effective package. (Note in the appendixes the report of the IOM Group referenced earlier, as well as a comparative analysis of the preventive care schedules recommended by various groups of other experts.)

At present, both private insurers and the Federal health financing programs fall short of providing services which are appropriate for reimbursement. Medicare specifically excludes preventive services. While it is possible that Medicare beneficiaries receive some preventive services in the course of a physician visit reported as being for a specific complaint, visits or services of a purely preventive nature are discouraged by the presence of a $60 deductible, if not by the letter of the law. Medicaid payment for preventive services varies with age group and by State. All States are required to provide preventive services to Medicaid recipients under 21, although the level is far from optimal. Preventive services for adults are specifically precluded in 14 State programs and could be limited or disallowed in 38 others because they may not be "medically necessary." Only one State, Wisconsin, affirmatively mentions preventive services for adults in its Medicaid plan.

The Federal Government could require that certain preventive services be reimbursed by its health financing programs. A package similar to that recommended for reimbursement by the Institute of Medicine panel could be adopted for Medicare and Medicaid now. Care should be taken so that recommended additions to the scope of services are consistent with those likely required under national health insurance. For Medicare, the law would be changed to permit reimbursement for a specified list of preventive services, and these services would be excluded from the deductible. For Medicaid, States would be required to reimburse for certain preventive services and the general provision allowing States to exclude services not "medically necessary" repealed. Before national health insurance, the same services could be required in all Federal Employee Health Benefit plans and urged upon other private insurers.

The incremental cost of the IOM proposal to the Medicare program is estimated at $1 billion in fiscal year 1979. For Medicaid, the incremental cost to the Federal Government would be $330 million and to the

States, $270 million. If the Federal share were increased to 75 percent rather than the current 55 percent, for these services, the cost to the Federal Government would be $450 million and to States $150 million. Extending the proposal to the entire population through national health insurance would cost approximately $9 billion in fiscal year 1980.

Amendments to Titles XVIII and XIX of the Social Security Act would be required for this program under Medicare and Medicaid.

b. Preventive Services in Group Health Care Settings

There is considerably more experience and a number of advantages in providing preventive care in organized settings compared with the fee-for-service sector. Examples of these organized settings include Community Health Centers, Health Maintenance Organizations, and Migrant Health Centers. The types of services to be offered in the organized setting would be determined to a certain extent by the population served. An HMO serving a middle class population would primarily concentrate on the delivery of personal preventive services to its populations. A Community Health Center or Migrant Health Center would likely also concern itself with community environmental issues, such as fluoridation, housing, and sanitation.

General notions to guide consideration of provision of preventive services in the organized setting include:

- Organized settings have financial incentives to keep people well and to contain overall costs. Most have built-in peer review and use less expensive personnel as well.
- Outreach and comprehensiveness of care can help ensure appropriate periodicity.
- While the problem of identifying effective preventive services still exists, organized settings with registered or enrolled populations are in a far better position to evaluate effectiveness and to alter services that are not effective.

While HMO's and Community Health Centers are advantageous settings for preventive services, many provide inadequate preventive care at present. This is primarily because the need for acute care strains resources. To deal with this situation, a separately funded preventive service module could be offered at full subsidy to federally funded health centers, and at a matching rate to HMO's and State or local health centers. The principal features and cost estimates for such a package are described in the appendixes.

Under national health insurance, the choice between organized settings and general reimbursement is not an "either-or" proposition, but rather a question of emphasis. There are two general approaches:

- Pursue a major expansion of organized settings and limit coverage of all but some specific preventive services to such settings. While the decision to expand organized settings does not rest solely on their superiority in providing preventive services, this capability is an important factor. Expansion could be pursued through a resource and service development fund established in tandem with national health insurance. This would ensure that dollar-limited development grants are not squeezed by an automatic reimbursement system. Financial incentives could also be offered to providers and consumers to participate in organized settings.

- Provide an extensive package of preventive services through general reimbursement. Grants to organized settings would still be needed for nonmedical facilitating services (outreach, environmental services) and perhaps for patient education and counseling. Organized settings would also be used to evaluate current and new preventive benefits. This would mean less than optimal delivery of preventive care but may be more feasible politically.

c. Problem-Specific Direct Service Delivery Programs

There is also widespread experience with the provision of certain preventive services for specific problems:

- Direct provision usually occurs where there is a communitywide, as well as an individual, health benefit (e.g., immunization); where it is desirable to reach large numbers of people in need of similar services in one place (e.g., school vision and hearing screening); or where a high risk group has lacked care (e.g., sickle cell screening for blacks). The range of directly provided services has been limited in the past by reluctance of public health officials to intervene in areas usually considered the province of private providers.
- The Federal Government pays for some directly provided services, but State and local health departments pay for more. Costs are not only contained by definition, but subject to tight budget constraints.
- Links with followup care may be lacking. EPSDT and the hypertension program suffer from this problem. Thus it is important to select one-stop or self-contained services for direct provision, or to establish adequate links to ongoing care.

There are a number of approaches to financing of directly provided services not covered under some form of health insurance. For example, certain preventive dental services could be provided to all children in school by hygienists. Another example would be worksite screening of employees in industries where cancer or respiratory disease is common.

Even in the presence of national health insurance Federal spending could be directed toward these purposes, again through a resource and service development fund. To the extent that State and local governments are afforded fiscal relief by national health insurance, some of the savings might be channeled into directly provided services as well.

If national health insurance is delayed, Federal public health funding may be provided to support strengthening of problem-specific preventive service programs administered through State and local agencies. The following section on capacity building in the non-Federal sector should provide an indication of those specific services which are important for direct provision.

2. Strengthening Non-Federal Sector Capabilities

If disease prevention and health promotion are to receive the serious emphasis they deserve, a stronger "prevention infrastructure" must be developed. Prevention activities of State and local health departments, health planning agencies, HMOs and other parts of the non-Federal health sector are essential. This should include not only organized health care settings, but also such settings as the school, the workplace, and the community. Voluntary agencies, too, are useful allies. They are significantly involved in health promotion, early detection, information dissemination, and other prevention activities.

Capacity building has been a strong Federal role. In addition to fiscal support for health agency programs of national interest, HEW agencies provide other forms of support and backstopping—e.g., technical assistance, expert consultants, and training programs. Maintenance of the quality of Federal capacity building efforts should be a high priority element of the HEW strategy for prevention.

a. State, County, and Municipal Agencies

Perhaps the most valuable resources in carrying out and coordinating a National prevention strategy are the official State and local health and education agencies. States budget in excess of $2 billion for public health activities (excluding Medicaid, and those mental health activities under separate State authorities); it is believed that local health agencies are a $3 billion activity of county and municipal governments. Participants in the IOM Conference and the PHS agency heads repeatedly emphasized the strength this traditionally provides to the prevention infrastructure. Some feel that these health agencies have been allowed to languish in recent years, undersupported and taken for granted. Yet, where community-based programs are involved, the facilities, people, and statutory mission of the official health agencies must inevitably be drawn upon.

There continues to be a strong partnership between the PHS and the State and local health departments. In providing project and formula grants for maternal and child health programs, family planning, and in infectious disease surveillance and control, PHS has long worked through this structure. More recently, environmental health programs, chronic disease activities, and other programs have started through this mechanism. The WIC nutrition program, administered by the U.S. Department of Agriculture, is operated through health departments. Laboratory support for screening, environmental sampling, and unusual diagnostic procedures, rely on the State public health laboratory. Clearly, a wide range of competencies, capacity, and interests are based on this component of the infrastructure.

To enhance the potential that these programs will be effective, expanded support from the Federal Government is needed. Examples of measures these agencies should be encouraged to take are noted below.

- Health promotion designed for population groups—Programs to be fostered include: local smoking reduction information and education programs; nutrition information and services in supermarkets, schools and child care centers, alcohol and drug abuse prevention programs for teenagers; driving safety education, surveillance and control programs; local and State fitness councils with construction of community-based and supported exercise facilities; carefully targeted programs in human sexuality and teenage pregnancy control; encouragement of local family development programs in schools, courts, and social services sites; experimental programs in risk factor reduction on a community basis; strong school health education programs.

- Health protection designed for population groups—Programs to be fostered include those to develop innovations in: fluoridation of water supplies; sanitation and waste disposal measures; reduction of hazards presented by lead in the environment, rat and mosquito control programs; zoning for better health; injury prevention; communicable disease prevention and control; worksite safety standards and inspection; food and cosmetics safety; radiological health services; environmental monitoring and standards enforcement; pesticide poison prevention; noise pollution control; health statistics research and analysis.
- Preventive health services provided to individuals—Programs to be fostered include those to: enhance immunization levels; provide sexually transmitted diseases screening; screen for hypertension, genetic disease, congenital defects and mental retardation; control diabetes; expand dental services; demonstrate prevention of mental health, alcohol and drug abuse problems in high risk populations; provide quality maternal and child health care to all persons; improve the nutritional status of women, infants and children; stimulate innovative community-based efforts to integrate preventive services and wellness programs.

b. Health Planning Agencies

State and local health planning agencies, established under P.L. 93–641, also strengthen the infrastructure for prevention under the two-tiered planning network now developing nationwide. The State Health Planning and Development Agencies (SHPDAs) and Health Systems Agencies (HSAs) have a number of ways they may contribute to prevention. The HSA's functions include assembling and analyzing data, developing plans, working to secure implementation of plan elements, and activities regarding appropriateness of health resource development. The State agencies prepare statewide plans based on the individual HSA plans, implement final plans, review institutional health services for appropriateness, and administer certificate-of-need programs. This strategy element presents a number of ways health planning agencies may address preventive services.

Planning for preventive health services needs to incorporate local perception of need. The North Karelia, Finland, community program to combat cardiovascular disease attributes its acceptance to community concern and initiative in seeking assistance. Grassroots involvement melds nicely with the infrastructure concept; efforts to build planning capacity have included consumer participation as a prominent feature. Ways HSAs can address prevention include the following:

- *Planning.*—In developing their Health Systems Plans and Annual Implementation Plans, the HSAs may analyze and address the need for community health promotion and protection, and prevention and detection services.
- *Education.*—Although the planning agencies are not likely to provide direct consumer health education, there are a number of educational activities that they may undertake, including: making information on preventive services and the provision of these services available to a wide population through the communications media; publicizing the health status of the population and any gaps in preventive or other types of services; informing potential and existing providers of the characteristics a preventive program should embody.
- *Advocacy.*—An advocacy role is an outgrowth of the planning and educating roles. A planning agency may work at the local or State level for new legislation, changes in existing legislation, or funding of programs that the agency feels are important to its prevention strategy. It may also advocate changes in reimbursement policies with such groups as Blue Cross/Blue Shield which promote preventive services.
- *Plan Implementation.*—Through the use of the Area Health Services Development Fund, a Health Systems Agency can sponsor the planning and development of preventive services. Although these funds cannot be used for actual services or construction, they can be used for planning and developmental activities that will help to implement the Health Systems Plans.
- *Coordination.*—The planning agencies are required to coordinate their activities with other organizations in the health care system, and when possible, provide technical assistance to such organizations in the process of implementing their plans. The agency could attempt to improve coordination of preventive strategies by forming committees composed of the providers of related preventive services.

c. Health Maintenance Organizations

HMOs are a major HEW target to provide alternative ways to organize the delivery of health services. Substantial evidence indicates that HMOs can provide comprehensive services for an enrolled population at lower total cost compared to traditional health insurance plans. HMOs are particularly suited to incorporate preventive health services into their health care system. Obviously, the HMO is an appropriate setting for preventive health services and for health education. The HMO Act of 1973 (P.L. 93–222) and subsequently the HMO amendments of 1976 (P.L. 94–460) mandate that qualified HMOs make available as basic services to all enrollees at least the following preventive health services: (1) a broad range of voluntary family planning services; (2) services for infertility; (3) well-child care from birth and periodic health evaluations for adults; (4) eye and ear examinations for children through age 17; and (5) pediatric and adult immunizations, in accord with accepted medical practice. In addition, HMOs are required to pursue health education. Continued capacity-building in the HMO area will contribute to a strong foundation for local prevention activities.

Some 6.3 million people are enrolled in 165 HMO-like plans. The extent of prevention practiced in these HMOs is unknown, but in principle and, in some well-known plans such as Kaiser Permanente, in fact, it is likely to exceed the norm for the health system as a whole. Many opportunities exist to build this capacity.

- Health promotion programs designed for population groups—HMOs should be financially encouraged to develop lifestyle programs for their members such as health hazard appraisal and exercise.
- Health protection programs designed for population groups—The majority of workplaces in the United States do not offer on-the-job medical services to their employees, nor do they have the facilities and expertise to protect and preserve employee health. Qualified HMOs provide a logical base for providing occupational safety and health services and for bridging the gap between industrial and family services. The provision of industrial hygiene services should be an integral part of the HMO program. Since the cost to the HMO of starting this program would be significant, financial assistance for startup costs should be considered. Initial services would include preplacement physicals, regularly scheduled physical examinations keyed to potential hazards, worker compensation service, emergency trauma services, and industrial hygiene. Later, workplace monitoring, education, and job risk evaluation could be added. Alcoholism programs, and health maintenance, such as exercise programs, could also be provided.
- Preventive health services provided to individuals—In addition to supplying preventive health services required by legislation, HMOs may be provided with grants to experiment with innovative services, including those delivered in the home or tailored to high risk groups.

d. Linkage Between Health Agencies

Mechanisms need to be developed which assure that the target groups for preventive services have access to appropriate preventive information and services. Capacity building among different health agencies can play a pivotal role to accelerate referral linkages among prevention programs. For example, health agencies should be organized to refer teenagers with health problems (e.g., STDs) for other needed services (e.g., family planning, drug abuse, nutrition education, and WIC). Three administrative options might be considered to develop health agency referral capacity: (1) propose a health service delivery grant requirement that health agencies have an arrangement with other health agencies for referral; (2) develop epidemiologic criteria for preventive referrals by age, race, and sex; and (3) propose a health service delivery grant requirement that health agencies must provide short-term training to develop staff capability in the area of referral skills.

e. Linkage Between Health Agencies and Social Service Agencies

Networks for linking social services agencies to the health/prevention service delivery system should be developed simultaneously with the systems themselves. Some preventive services are delivered by grantees of the Office of Human Development Services (e.g., nutrition program for the elderly, immunization as part of Head Start); however, social service agencies are not primarily in the business of providing health/prevention services. It is probably neither appropriate nor cost-effective for OHDS grantees to provide the full range of such services. Therefore, a network should be established to link social service agencies to the basic delivery system for health/prevention services. Current OHDS legislation does not preclude any OHDS service provider from referring clients to other agencies equipped to deliver health/prevention services. Most OHDS grantees offer information and referral (I&R) assistance, and in many cases preventive services are actually purchased for clients. If a consolidated health/prevention grant program is developed, however, coordination between social and health services agencies must be ensured. Explicit provision should be made for establishing linkages, and funds should be available expressly for this purpose. Three basic alternatives may be proposed for strengthening linkages between social service and health agencies: (1) stipulate that a portion of service moneys given to each OHDS grantee must be used for linkages between social service and health agencies; (2) authorize additional Title XX—(Social Security Act) funds to States specifically for linkages; and (3) use a portion of the Secretary's discretionary funds in the consolidated grant program (expanded version of the currently proposed legislation for preventive services) for linkages.

f. Linkage Between Health Agencies and Education Agencies

The schools have been previously identified as key settings for the delivery of health information and education important to prevention, as well as for the provision of certain preventive services. For either activity to be effective the health-related capabilities of State and local school offices need to be strengthened, and strong ties developed between health agencies and education agencies. To implement this effort, it may be necessary to provide grant funds for the development of such linkages and moneys for State education agencies to develop innovative health education programs.

3. Determination and Enforcement of Health and Safety Standards

As noted earlier in the discussion of health protection measures designed for population groups, regulatory actions can provide effective mechanisms for protecting the public against environmental and other hazards. Regulations controlling the risks related to the various sources of hazards can come from several governmental levels. The Federal role in these regulatory processes is important to: (1) developing the research base on which minimum safety standards are established; (2) implementing those standards where the normal market factors or State and local efforts are not operating effectively, or in cases of dramatic national importance; (3) supporting where possible the capabilities of States and localities to efficiently manage their regulatory efforts; (4) providing uniformity in the approach to regulation where such uniformity appears desirable for reasons of economics or implementational efficiency; and (5) ensuring that questions of health and safety are addressed where Federal moneys are employed in projects with potential health hazards.

The Federal role in most of the potential measures described in the earlier section on health protection for population groups is largely the responsibility of agencies outside HEW, and whose activities are described in section V. The regulatory base is already well developed in support of prevention and protection programs in the environment area, but the responsibility is diffused across the government and even within departments. For the workplace environment, lead research responsibility is held by the National Institute for Occupational Safety and Health (NIOSH), in conjunction with the National Institute for Environmental Health and Safety (NIEHS), the National Cancer Institute (NCI), and other NIH elements. Regulatory responsibility, however, is held predominently by the Occupational Safety and Health Administration (OSHA) in the Department of Labor. In the broader sense, the Environmental Protection Agency (EPA) has lead environmental regulatory authority and conducts some of the underlying research. Related research, however, is performed, *inter alia,* by NCI, NIEHS, and other NIH institutes. Also involved in environmental health protection-regulation in its broadest sense, however, are the Food and Drug Administration, the Consumer Product Safety Commission, the Department of Energy, the Department of Transportation, the Center for Disease Control, the Department of Agriculture, and others.

Too often absent has been effective coordination between the research and the regulatory agencies, so that the work of the former relates well to and is supportive of the latter. As an example, OSHA has often complained that the NIOSH research, which must serve as the basis for OSHAs criterion documents, has failed to meet OSHAs regulatory needs. Indeed, overlapping, even duplicative research investments have several times been made by the two agencies. In a somewhat analogous fashion, the bulk of animal testing of substances for carcinogenicity is conducted by NCI, yet there has frequently been little agreement among the concerned agencies about the priorities to be assigned to alternative test candidates.

In this context of limited resources, varying interests and responsibilities the central need is to develop mechanisms to coordinate and tie together the research needs of the regulatory bodies with the capacities of the research components. Over the past few years, efforts to rationalize these splits have led to establishment of several "coordinating" bodies;

e.g., the Committee to Coordinate Toxicology and Related Programs (CCTRP) and the Interagency Regulatory Liaison Group (IRLG). The most supporting working committees to the IRLG include the participation of representatives from several of the research agencies: NIOSH, NCI and others. The linkages between the regulatory and research agencies, however, lack those formal agreements and commitments to tie together the founding regulatory agencies. They also lack the concurrent commitment to concerted joint action which the IRLG regulator-membership is increasingly accepting. Strong leadership is needed to secure agreements between concerned agencies for common setting of relevant agenda between the regulators and researchers dealing with environmental health. HEW should be more actively participating in the health-related decisions of regulatory agencies.

Not all Federal regulatory measures are directed at controlling the content or design of products and processes. Many activities can be structured to provide information which allows the consumer to make wiser choices. Examples include the requirements for informative labeling on containers and advertisements of tobacco products, food, drugs, and alcoholic beverages, as well as requirements that television and radio advertisements be fair and informative.

Regulations which implement Federal programs can also be important tools in the promotion of health. Examples could include the requirement that States receiving highway construction funds enforce safe speed limits and set aside funds for construction of fitness trails; that feeding programs emphasize nutritious food and educate consumers on sound nutritional practices; that State Medicaid programs reimburse for an expanded range of preventive services; that special safeguards be employed in institutions housing governmentally sponsored research and testing; and that buildings constructed with Federal funds provide protection for nonsmokers.

4. Manpower Development

The development and delivery of effective disease prevention and health promotion activities will depend on an adequate supply of appropriately trained health manpower. A broad range of health professionals are involved in prevention, and workers in other fields (education, social work, engineering, chemistry, etc.) are becoming involved as non-health-care settings are increasingly used. The Federal Government is key to the development of adequate manpower for prevention. Manpower development should be aimed at two targets: preparation of persons not currently working in the given disciplines, and increasing the knowledge and skills of existing personnel. Grants, contracts, stipends, and student loans are among the methods HEW has used to foster manpower development. In addition, several agencies provide short-term training directly to upgrade skills and transfer new knowledge. Training by Federal agencies of their own personnel is also important to maintain the quality of HEW prevention activities.

The strategy for manpower should also include efforts to affect the content of curricula in the programs in which a variety of professionals (e.g., medicine, education, social work) are prepared. For example, many feel that one reason physicians do not practice preventive medicine is that the primary emphasis of their training is on the treatment of sick people. Greater emphasis on the skills needed to practice health promotion could be incorporated into medical school curricula, as well as into training curricula for other types of professionals working toward disease prevention. This must be done with care, and in concert with other significant medical school curricular changes, for previous efforts to incorporate a preventive emphasis into curricula focused on diagnosis and treatment have not been successful in changing physician attitudes.

Perhaps the clearest manpower need is that for epidemiologists, whose work provides support for most of the activities in prevention. While acknowledging limitations of epidemiologic techniques, epidemiology is a vital discipline for planning prevention programs. As the focus of prevention increasingly turns to detecting and reducing risk factors, we will need epidemiologists to refine and extend our understanding of behavioral and environmental influences on health, and the population subgroups most at risk. Agency heads, consultants, and participants in the IOM Conference reiterated this theme. Increased support is needed for training of epidemiologists in academic institutions, stipend support or student loans targeted for epidemiology students, and training in toxicology for existing epidemiologists.

The CDC trains and utilizes physicians as medical epidemiologists in its Epidemic Intelligence Service (EIS). In addition to serving as the PHS primary resource for responding to requests from States for epidemiologic assistance, more than half of EIS alumni stay in public health when they finish their work at CDC—in States, academic institutions, and other Federal agencies. CDC has a number of EIS officers committed to environmental investigations, but could recruit and place double or triple that number, if positions in environmental areas were available in States and Federal agencies.

There are in addition specific needs for the three general categories of prevention activities:

- Manpower for health promotion programs designed for population groups—Improving the curricular emphasis on health promotion in the training of health and other professionals would provide the most important gains for health promotional activities. Efforts should include greater emphasis in the training of doctors, dentists, nurses, and other health professionals, in dealing with behavior related to smoking, nutrition, alcohol and drug use, exercise, sexuality, and stress. Emphasis on these factors should also be incorporated into the curricula of students studying subjects with potential to affect the health and well-being of population groups—e.g., design, business, architecture, engineering, city planning. In addition, some supplementation is needed in the numbers of certain categories of workers important to health promotion. Most notably, these include: behavioral scientists specializing in health-related behaviors such as smoking, nutrition, exercise, driving, alcohol and drug abuse; media specialists with expertise in these areas; outreach workers trained to involve people in programs; nutritionists; and day care and school health educators (including nurse practitioners).

- Manpower for health protection programs designed for population groups—Demand by both industry and government for workers for occupational and environmental health protection has increased considerably with expanded regulation in the area. Shortages exist in the numbers of skilled workers to address issues in occupational health (safety specialists, industrial hygienists, physicians) and in environmental health (environmental toxicologists and skilled laboratory workers to run the monitoring and testing programs). The Educational Resource Centers funded by NIOSH and the career development programs of the NIEHS need additional support to meet the anticipated needs. Furthermore, there are a variety of areas where change in content or emphasis of curricula is needed if health protection is to receive adequate emphasis by practitioners. Health care professionals should be trained to identify high risk populations, to diagnose and treat environmentally related illness (especially those associated with occupational hazards), and to assist in educating the public in prevention of disease and promotion of health. Training for physicians, nurses, and other health professionals should include instruction in the use of a detailed occupational history. Professional associations should also be encouraged to support this concept. Training for physicians, nurses, and other health professionals should also include a strong background in epidemiology.
- Manpower for delivery of personal preventive health services—Delivery of preventive health services in organized health care settings requires manpower similar to that required by primary care in general. Persons specializing in health promotion, such as health educators and public health nutritionists, are also likely to be needed. HRA's Bureau of Health Manpower (BHM) projects that increases in all major health professions between 1975 and 1990 will far exceed population growth. The ratio of physicians per 100,000 population is projected to increase 37 percent by 1990, from 177 per 100,000 in 1975 to 242 per 100,000 in 1990. The declining number of physicians trained in primary care is expected to reverse itself in the 1980's, largely because of increases in internal medicine and family practice residencies. The BHM estimates that the percentage of MDs in primary care specialties will rise from approximately 38.3 percent in 1975 to 46 percent in 1990. Practitioners trained in primary care are judged more likely to emphasize health maintenance and disease prevention in their practices.

The current output of graduate medical education training programs is not derived from any agreed upon national goals for specialty manpower requirements, although the most recent health professions legislation requires progress toward a goal of 50 percent of first-year residencies in the primary care specialties. To move toward a more refined definition of specialty requirements, the Secretary has established the Graduate Medical Education National Advisory Committee. This Committee is to analyze the distribution among specialties of physicians and residents and to evaluate alternative approaches to ensure an appropriate balance. Also of special importance to the Committee will be health care financing and reimbursement issues which heavily affect the support and scope of graduate medical education.

Other practitioners also have opportunities to provide preventive health services. Nurses: the role of the nurse has expanded in health maintenance, including health education, genetic counseling, hospital infection control, and many other specialized duties. More public health nurses will be needed as the role of health departments grows in chronic disease, environmental health, and health promotion. Dentists: dentists and dental hygienists are concerned with oral hygiene and prevention of dental disease, as well as dental care. Allied Health: a variety of other health workers have roles in prevention, such as early detection of health problems and nutrition and other areas of counseling.

The following represents the best assessment available to the BHM of the most important needs for new manpower:

Manpower category	Current supply 1978	Additional needed by 1980
Environmental toxicologists	5,400	1,000
Occupational safety and health	85,000	15,000
(Safety specialists)	(37,000)	(7,050)
(Industrial hygienist)	(4,800)	(930)
(Safety and health generalists)	(20,000)	(3,660)
(Physicians)	(1,010)	(300)
(Other—radiation, fire protection)	(12,810)	(2,180)
Health service administrators	15,000	10,000
Epidemiologists	1,500	500
Biostatisticians	1,600	900
Public health nutritionists	1,500	1,100
School nurse practitioners	500	....

Furthermore, HRA has projected the supply of physicians, nurses, dentists, and other health professionals involved in direct patient care. It should be noted that these professionals provide principally diagnostic and treatment services, but also some preventive health services. The table below exhibits HRA's estimates of the number of professionals available in six disciplines in 1975, the estimated supply in 1990, and the estimated need in 1990.

Health Professions Supply and Requirements Projects

Discipline	Supply (000) 1975	1975 ratio per 100,000 population	Supply (000) 1990	1990 ratio per 100,000 population	Requirements (000) 1990
Physicians	378.6	177.3	594.0	242.4	543.0–571.0
Dentists	112.8	52.9	153.0	62.4	153.7
Optometrists	19.9	9.3	26.7	10.9	25.9
Podiatrists	7.3	3.4	12.5	5.1	16.1
Pharmacists	122.5	57.4	185.4	75.7	190.3
Registered nurses	906.0	427.0	1,484.0–1,587.0	616.0	1,571.0–1,885.0

5. Provision of Economic Incentives

Economic incentives can be used to promote or reinforce desirable prevention activities. Positive economic incentives are a potentially powerful encouragement—to environmental protection, to personal behavior change, and development of preventive services and new service delivery methods. The use of financial incentives is hardly a novel concept for government in general—economic policy has traditionally used investment tax credits to business to spur industrial capacity investment, or create jobs. There may be much greater potential to pursue this strategy element in prevention than has been HEW's policy in the past.

Incentives other than financial can have value in fostering prevention activities. While it is difficult to evaluate effectiveness, it is neither costly nor harmful to support prevention activities through less conventional methods. For example, HEW could take a page from the environmental movement: both a corporation (American Motors) and a nonprofit foundation (National Wildlife Foundation) give a "Conservationist of the Year" award. The Secretary could establish an HEW award for contributions to prevention for employees or for the outside community. Similarly, HEW could issue commendatory press releases for outstanding corporate behavior in prevention; United Airlines' modification of its airline meals to lower calorie, lower fat portions might be an example.

The use of economic sanctions is another method of promoting and/or reinforcing prevention activities. Like regulation, it may be less desirable than more positive methods but in some areas it can be used effectively (e.g., taxing cigarettes to discourage smoking).

The following are examples of the ways incentives (and, in some instances, sanctions) might be used to stimulate the adoption of prevention activities in the private sector.

- Incentives for health promotion designed for population groups—Examples include: tax benefits to industries and corporations providing health-behavior educational programs and counseling; tax incentives for capital investment required for corporate employee risk assessment and risk reduction programs; tax incentives for business and communities that establish exercise facilities and programs within acceptable guidelines; Federal matching grant programs to communities for the establishment of facilities and programs that will promote physical fitness; incentives for "health days" instead of sick days; e.g., bonus for individuals with limited absence from work due to illness; third party reimbursement for prevention programs, risk assessment, and risk reduction programs; and insurance incentives for safe driving records, driver education, etc.

- Incentives for health protection designed for population groups—Such incentives include the use of either tax credits or favorable amortization to lower the cost of investments in occupational safety or health control equipment would stimulate investment in this type of equipment. To help small business make improvements to protect worker safety and health, Federal loans, loan guarantees, and other forms of financial assistance should be made generally available for voluntary compliance programs. Costs to industry also would be mitigated by other benefits. Companies would benefit in the long run by reduced absenteeism and workers' compensation payments as acute and chronic hazards are reduced. In some cases, the introduction of this equipment would also profitably enhance the efficiency of certain operations. For example, construction of automatic material handling and reactor cleaning technologies to comply with Federal vinyl chloride regulations has reduced producers' yearly in-plant and atmospheric discharges, and at full capacity the quantity of vinyl chloride monomer thus recovered by the industry in 1974 would have had a market value of $2 million.

A major incentive through sanctions could be provided by reform of the workers' compensation system. In its present form, workers' compensation has failed to induce preventive activities. In theory, by making employers internalize the costs of accidents and disease, workers' compensation should serve as an incentive to reduce workplace hazards, but, in fact, employers do not pay enough of these costs to make safety and health pay. Subsidies are provided indirectly because benefits are generally not taxable and administrative and rehabilitation costs are supported by State and Federal funds. Moreover, to the extent that workers' compensation succeeds as a risk-pooling insurance scheme, individual employers' payments are insensitive to the level of accidents and disease suffered by their employees. Insofar as employers are thus protected, both individually and collectively, from absorbing the full cost of accident and disease rates, the effectiveness of workers' compensation as a preventive incentive is diminished.

Workers' compensation should meet new standards which would include coverage for defined occupational diseases associated with specific exposure or occupations. Occupational disease should be defined such that an illness may be deemed to have arisen out of and in the course of employment if work-related factors were a contributing cause, with compensation proportional to the attributable risk associated with the occupational factor.

Awards should also be adjusted to reflect living costs. Uniform standards should be established for workers' compensation and they should apply to all businesses regardless of size. These changes would result in more interest on the part of employers in improving the occupational safety and health conditions of their workers.

When a good faith effort to meet occupational safety and health standards relevant to illness or injury has not been made, then the affected worker should be allowed not only compensation but also the right to bring suit to seek additional awards. This in effect removes the limitation of liability where gross disregard for occupational safety and health has occurred.

- Incentives for the expansion of personal preventive health services—possible measures include: "bonuses" to CHAP programs which exceed targets, food stamp bonuses or other support for compliance with prenatal regimens; incentives to HMOs to expand their preventive services beyond mandated minimums; lifting applicability of cost-sharing or deductible provisions of insurance plans from preventive services; publicize and commend HMOs, Community Health Centers and others which have model prevention programs; higher salaries for public health personnel to attract and retain better people to underpaid professions.

6. Provision of Leadership and Coordination

The Federal Government, and particularly the Department of Health, Education, and Welfare, has a special mandate to care for the health and well-being of the American public, and to advocate values, policies, and programs designed to protect and improve the public health. This leadership role is illustrated by the major new HEW program to reduce cigarette smoking. Few would dispute that cigarette smoking is the most important public health problem today, and it is fitting that impetus for renewed action comes from the Department. This in no way negates the unstinting efforts of our allies in voluntary agencies, health agencies, and the health care sector over the past decade or more.

Indeed, coordination of public sector and private sector efforts is one element of a Federal leadership strategy. HEW can lend its "good offices" and provide a focal point for the many groups and sectors interested in a given prevention objective. Through clearinghouses and conferences, information on needs and successes can be shared, and affirmation of special needs can be made.

Several participants at the February Institute of Medicine Conference stressed that decisionmakers must be educated about prevention. We should not assume that political leaders, community leaders, or the general public for that matter, have an adequate grasp of the importance or nature or even the impact of prevention, nor of a strategy for change. HEW can and should take a lead role in educating the Nation's leadership. Issuing a Surgeon General's Report on Prevention would be an important event—a visible, scientifically documented vehicle for publicizing this

Department's commitment to prevention, and articulating for decisionmakers the case for doing more.

Furthermore, HEW should consider a deliberate, annual review of the major causes of death, illness, and disability, to examine at least: (1) the prevalence and the severity of the cause, and (2) its vulnerability to prevention. In this way, both priorities and opportunities will be clearly evident. Followup activities to the Surgeon General's Report on Prevention could disseminate the results of these reviews and encourage Health Systems Agencies and State and local governments to carry out the same protocol specific to their own populations.

Acting as the advocate and defender of the disadvantaged is another leadership function of HEW vigorously applicable in prevention. Blacks and other minorities, the poor and the near poor, the jobless, and the undereducated, have much higher rates of preventable diseases and conditions. A national "affirmative action" health policy by HEW could set as a goal the reduction of a variety of preventable conditions toward a level we know is attainable—the rates of illness observed in groups in this country who are not disadvantaged. The Department cannot immediately overcome all the negative influences which impinge on health, but the strategy actions described in this report can narrow the gap, if applied with the special needs of the disadvantaged in mind.

There are a number of important ways in which HEW leadership is important:

a. Coordination

Hundreds of voluntary agencies, professional societies, environmental groups, State and county health offices, community organizations and public health interest groups have great interest in prevention. New activities can and should benefit from the views of these organizations and mobilize their participation. (Representatives of public interest groups, State and local government associations, and the health sector have been consulted in developing this report.)

In the health promotion area, the Office of Health Information and Health Promotion as well as the PHS agencies should maintain an effective liaison with private groups. The private sector National Center for Health Education and the National Health Council, representing a variety of organizations, are possible mechanisms to involve the private sector in a relatively rapid manner.

In the area of health protection, HEW should exercise leadership in working with the private sector. The magnitude of the environmental problem dictates a need for everyone to cooperate. For example, in the field of occupational safety and health, the bulk of occupational surveillance activities could be achieved through the cooperation of the insurance industry and the use of data systems to be established in the national health insurance program. Toxicological research as it relates to new chemicals and the health effects of exposure to them in the workplace would be largely conducted by industry. The development of new control technology and the installation of the engineering controls to protect workers would be the responsibility of the private sector with the PHS providing resources for assessment of, and a clearinghouse for data on, effective controls. The HEW program of technical assistance would focus on maintaining a core of expertise to support State and local programs funded with State resources or through Occupational Safety and Health Administration grants. Long-term followup and care of workers previously exposed to occupational hazards could be funded through reforms involving health insurance or workers' compensation laws. None of these efforts is likely to take place without departmental stimulation, negotiations, and in some instances exhortation of the appropriate interest groups.

In the area of personal preventive health services, the National Immunization Initiative is a model for an intentional, systematic effort to involve the nonpublic sector in a coordinated approach to a national prevention objective. New activities initiated in prevention should include this kind of effort in the agency implementation plans. The Government ought also to sponsor careful analyses of the costs and benefits of preventive services.

There are so many Federal agencies involved in disease prevention and health promotion that a Federal Prevention Roundtable, chaired by the Surgeon General, the Secretary, or a Presidential designee from the Executive Office of the President, ought to be established to provide a regular forum for discussion of common interests in prevention.

b. Information Development and Dissemination

The Federal Government has an obligation to serve as a clearinghouse for the vast array of information related to health promotion and disease prevention which is developed in both the private and public sectors. In this regard it is not to act as a censor but to provide review, testing, and guidance in facilitating public access to the most reliable and effective information. In areas where information is inadequate, or for those settings for which there is not appropriate information, the Government should stimulate the development of the necessary information. The National Clearinghouse on Health Information, currently being developed in the Office of Health Information and Health Promotion, can be very useful in developing this forum for leadership.

c. Example

Setting an example is another form of Federal leadership. HEW should encourage each agency to adopt an employee program geared to disease prevention and health promotion. Demonstrating such an effort in a Federal setting could serve as a model for other Federal agencies and other employees. (A few such programs have been funded in PHS units.)

Fitness programs and smoking cessation programs are possible elements. Similarly, akin to its stringent smoking policies, HEW could set nutritional standards for its cafeteria, ban cigarette sales in HEW facilities, etc. HEW could foster less stressful work environments, noise reduction, safety efforts, and other environmental actions to improve its own workplace. HEW employees could also set examples by electing not to practice unhealthful behaviors while representing the Department.

d. Negotiation

The Federal Government has important persuasive power which might be used to foster prevention and health promotion. HEW agencies can expand efforts to negotiate voluntary industry compliance. It has been suggested that occupational health strategies in this country need to shift from an adversarial posture to one of negotiation. HEW can apply this principle to food, alcohol, tobacco, and perhaps firearms manufacturers and retailers as well. Examples include: work to encourage the adoption of a voluntary code for advertising directed at children, by food manufacturers and distributors; the development of new food options to include more healthful foods, as well as to consider prudent dietary practices and energy balance in their advertising; urging the development and promotion of less hazardous cigarettes and methods of smoking (National Cancer Institute); working with the alcoholic beverage industry to reduce the appeal of advertising messages to children and young people; and to lower proof of alcoholic beverages (NIAAA).

Other areas of governmental negotiation include safer cars, safer road designs, as well as public education on the relationship of alcohol to traffic accidents and fatalities. Environmental impact statements provide one model for such negotiations, and "health impact statements" might be considered to ensure health and safety in large projects.

e. Exhortation

Federal leadership can be applied in direct appeals to the public and advocacy of a set of values regarding health promotion, drawing on the respect vested in the Department's leadership. Both the Secretary of HEW and the Surgeon General share in a long tradition of leadership in national health issues. Exhortation can serve an important leadership function if carried out in a sensitive manner. The reason for encouraging people to take action needs to be clear and easily understood (i.e., data on health hazards, increasing incidence of risk factors or diseases, etc.). The setting has to be structured so that people can exchange information (about the health problem and possible solutions) with community leaders. Its use must be selective and the intent and tone must be perceived to be helpful and useful. With these caveats in mind, one constructive exhortation would be a Presidential "fireside chat," followed by a series of regional meetings to offer the opportunity for public response to the President's statement on prevention. Examples of exhortation activities include: a national physical fitness award as a motivational device to increase adult exercise participation; expansion of the Presidential Sports Award program; general leadership and Recognition Awards for innovative lifestyle programs developed by local schools and districts, businesses and industries, communities, and Governor's and Mayor's councils on physical fitness.

7. Expansion of the Knowledge Base (Research, Data Collection, and Cost-Benefit Analyses)

a. Research

While there already exist many interventions to accomplish the goals listed in the 12 strategy targets in section II, many opportunities and challenges remain for research to develop techniques to prevent disease and promote health. The Federal Government has the ability and the obligation to mobilize the Nation's research resources to expand the knowledge base for prevention.

Healthful behavior is an area in which a research strategy is especially important. We need to improve our understanding of the roles of various lifestyles in the etiology of disease. Furthermore, sound studies are needed on ways to help the individual modify lifestyle into a more healthful pattern.

In our complex and constantly changing environment, man is exposed to many substances in many forms and by many routes (e.g., skin contact, inhalation, ingestion or, in the case of physical factors such as noise, through sensory organs). Such exposure can lead to acute and chronic health problems, which may be physiological or psychological.

The working environment demands special attention for several reasons. First, because they may be exposed to higher concentrations than the general population, some workers are often at unusually high risk from chemical hazards. In this regard, incidents that occur in the occupational setting may have implications for the population in general. It has been estimated that as many as 100,000 deaths and nearly 400,000 new cases of diseases occur annually as a result of occupation-related factors. Second, accidents account for about 14,000 deaths, while injuries total about 8.5 million each year. Third, little is known about effects of interaction of physical and chemical agents in the workplace. And fourth, effects of factors such as stress, inactivity, and job satisfaction, on both physical and emotional well-being, are not well understood.

Once hazards are identified, however, their effects can often be controlled and their undesirable consequences prevented. Regulatory agencies such as the FDA, EPA, OSHA, and CPSC, that have a mission to protect the public health through promulgation and enforcement of standards and regulations in the general environment, food supply, and workplace, rely upon the science base developed by research in environmental health sciences.

Preventive health services can also benefit from research. New and improved vaccines can help to prevent infectious diseases. Refinements in diagnostic procedures can enhance the feasibility of screening.

The magnitude of the research task in prevention is considerable. It will be necessary to utilize segments of the entire research community: Federal, State, academic and commercial laboratories. Present Federal programs must be coordinated to avoid unwanted duplication. In many cases expansion might be proposed to meet rapidly growing problems, but retargeting of existing program resources should be considered. State laboratories could be encouraged to carry out research most nearly associated with their specific responsibilities. Academic and commercial research would probably cover the entire spectrum and be supported through the use of grants and contracts.

Coordinated research planning procedures should be developed and followed to assure that results derived from basic research are translated into practical measures. This would require direct and continuing staffing among the agencies sharing research, service or regulatory responsibilities.

One of the principal problems in attempting to identify important areas of prevention research lies with the difficulty of defining the parameters of prevention research. While there is no question that a full understanding of the basic processes of human biology and disease ought theoretically to contribute to the foundation of disease prevention, most of the untargeted basic laboratory research bears only a very distant relationship to the actual prevention of disease (or even the treatment of disease). Most of it has not yet found its way into the practice of disease prevention. Consequently, a definition which includes all of research as prevention research is not helpful.

At the same time, a definition that is limited only to applied research will exclude a number of research efforts that might be useful in disease prevention. For example, a restrictive definition including only applied programs on disease prevention excludes epidemiological research and all research in the etiology, pathophysiology and mechanisms of disease.

For the purpose of this discussion on research strategies for prevention, a somewhat broader, goal-oriented definition will be adopted to include consideration of any research *designed* to yield results which can be *directly employed* to promote health or prevent disease or the progression of presymptomatic disease. Even this broader definition excludes basic research activities that ultimately may contribute to disease prevention, but it does allow for inclusion of epidemiological and laboratory-based research activities designed for use in disease prevention.

This definition envelops three categories of research activity: experimental research, epidemiologic research, and applied research. Experimental research in prevention includes problem-oriented basic research in either the laboratory or the field which is specifically designed to yield results that can be directly employed to promote health or prevent disease. Excluded is undirected experimental research into physiology, pathology, disease processes or disease etiology, that is unlikely to be directly employed to prevent disease. Examples of experimental research in prevention would include research to determine the role of lifestyle practices as contributors to disease, research to identify environmental etiologic or exacerbating agents in disease or research to develop a vaccine to protect against disease.

Epidemiologic research is especially important to disease prevention and health promotion. Scientific investigation of the determinants, the prevalence and incidence, distribution, and results of disease in human populations is necessary to our understanding of the natural history of disease, and the identification of points where preventive intervention may be possible. It can be used effectively to detect previously unsuspected relationships between health of people and specific environmental contaminants, or behavioral characteristics, or a variety of demographic and other attributes, or specific services received or not received. It can isolate factors associated with increased disease, and thus identify groups who are at especially high risk within a larger population. It can quantify the impact of various factors and combinations of factors, and the health consequences of changes in those factors. Thus, epidemiological research is a powerful tool in the armamentarium of prevention.

Applied research identifies specific applications for scientific findings which indicate opportunities for prevention. This includes development of control program methodologies, preventive health service systems and technology, laboratory and environmental sampling methods, demonstrations and evaluative research.

Noted below are prevention research topics about which more information is needed:

- *Chronic diseases*

  Cardiovascular diseases.—Research into: the role of cultural and behavioral risk factors in the etiology of coronary artery disease, hypertension, and stroke; genetic factors in cardiovascular disease; etiology of congenital heart disease; effects of acute and chronic exposure to various physical and chemical environmental and occupational hazards (e.g., trace metals, carbon monoxide, "soft" water, aerosols, temperature, humidity, radiation, noise, and electric current); the effectiveness of information programs in heart disease and high blood pressure, including those directed to the workplace and the community.

  Cancer.—Research into: the role of smoking, nutrition, alcohol, and sunlight in cancer; the geographic distribution of cancers; high-risk groups; the relation between animal carcinogens and human carcinogens; rapid, short-term in vitro tests to predict mutagenicity, teratogenicity, and carcinogenicity of chemical and physical exposure sources in the home, workplace, and general environment (particular emphasis on exposure of pregnant women); ways to substitute less hazardous materials or processes or remove hazardous substances from the body; improved techniques to defeat cancer at treatable stages; the effectiveness of various prevention initiatives.

  Respiratory diseases.—Research into: establishment of more reliable threshold limits for exposure; improved air sampling and methods for specific compound identification in ambient air; refined early indicators of exposure (histologic, biochemical, and radiologic) to permit reversal of respiratory problems; cultural, behavioral, and occupational risk factors in the etiology of chronic respiratory disease; reliable genetic screening techniques for cystic fibrosis; identification of populations at high risk for respiratory disease; vaccines and antiviral agents to protect chronic respiratory disease patients from acute infection. (In March 1977, a task force convened by the Division of Lung Disease of the National Heart, Lung, and Blood Institute, submitted a report addressed to the prevention and control of respiratory diseases which contains elaboration of these points.)

Diabetes mellitus.—Research into: the role of dietary factors in the etiology of diabetes; epidemiology of juvenile onset diabetes; effectiveness of diabetes screening programs.

Arthritis.—Research into: dietary factors in osteoporosis and degenerative arthritis of age; exercise in arthritis; effectiveness of screening for hyperuricemia.

Neurological problems.—Improved epidemiologic research into the incidence of chronic nervous system diseases may be helpful for identification of etiologic factors.

Others.—Research into: possible behavioral changes induced by chronic low level exposure to chemicals; and identification of hazardous factors in the worksite (stress, noise, chemical exposure) on the diseases of the cardiovascular system, liver, kidneys, nervous system, and reproductive system.

- *Communicable diseases.*—Research into: prevention of infant infection by toxoplasmosis, cytomegalo viruses, herpes viruses, and Group B streptococcus; vaccines against communicable diseases for which no effective vaccine is currently available (e.g., gonorrhea, syphilis, hepatitis); improved vector control techniques (rats, insects, etc.); epidemiology of immunizable diseases, STDs, influenza, enteric and nosocomial infections; role of water management of vectors in human disease.
- *Traumatic injury and death.*—Research into: automobile design; highway design; determinants of driving behavior; patterns, psychological determinants, and geographic differences or similarities in types of injuries; injury control measures in home and recreational environments.
- *Mental retardation and congenital defects.*—Research into: specific tests for heterozygote screening and newborn screening; teratogenic exposures during pregnancy; role of contamination of mother's milk by environmental pollutants as a cause of impaired mental development; relation between lifestyle habits of the pregnant woman and mental development of the child; the use of alphafetoprotein in the intrauterine diagnosis of central nervous system defects; genetic counseling methodology and practice.
- *Pregnancy and the neonatal period.*—Research into: identification of teratogens in the diet, medications, the workplace or the environment; the relationship between environmental insult and genetic disease; the role of maternal smoking, nutrition, alcohol consumption, or stress in producing developmental defects in the fetus; improved methods of measuring exposure to hazardous substances during pregnancy; improved contraceptives for males and females; identification of infants at risk for sudden infant death syndrome; interactions between physiological and psychological factors leading to high risk pregnancies.
- *Dental disease.*—Research into: the etiologic agents in caries; the etiologic agents in periodontal disease; antiplaque and anti-

microbial materials and procedures; noncarcinogenic sweeteners as dietary sugar substitutes; the application of known dental disease prevention technology.

- *Vision and hearing.*—Research into: toxic effects of drugs and light on retinal tissue; corneal infection by herpes simplex virus; treatment and prevention of trachoma; cataract development; diagnostic techniques in glaucoma; effects of atmospheric pollutants and other environmental toxicants on the cornea and conjunctiva; role of environmental and occupational noise in hearing loss; relation between auditory abnormalities and geographic sites.
- *Emotional disorders.*—Research into: impact of stress found in the workplace-role conflict, technological change, lack of job satisfaction or security, occupational obsolescence; effects of housing, services, transportation, and overcrowding on mental health; impact of dietary factors, including artificial additives, on emotional states; characteristics and etiology of postpartum disturbances; epidemiology of marital disruption; development of service models; coordination of services; role of CMHCs; mental health care delivery systems in disasters; populations at risk of suicide.
- *Childhood and adolescent development.*—Research into: determinants of childhood learning ability and the early identification of learning disabilities; developmental determinants of behavior—with particular emphasis on smoking, diet, alcohol, driving, and accidents; role of nutrition in childhood and adolescent development; characteristics of abnormal emotional behavior at very early stages; environmental factors especially hazardous to children—e.g., lead concentrations.
- *Enhanced general physical and emotional well-being (lifestyle)*

  Smoking.—Research into: synergism between smoking and occupational hazards; effects of cigarette smoking on the health of others; identification of smokers at greatest risk; factors that lead to dependence on tobacco; less hazardous cigarettes; effective techniques of smoking cessation and long-term maintenance; effective prevention of smoking by children and youth (peer models, "teenage self tests," etc.); alternative uses of tobacco crops.

  Nutrition.—Research into: the effects on health of deficiencies or excesses of trace elements, calories, vitamins, etc.; the variability of individual requirements for nutrients; the relation between nutrition and chronic disease; determinants of nutritional behavior, including the impact of the electronic media on that behavior; development of attractive and palatable low-calorie food products; the impact of product labeling; the development of innovative educational techniques to promote prudent dietary practices.

  Alcohol abuse.—Research into: the fetal alcohol syndrome (FAS); the drinking practices of women of childbearing age, the relationship of stillbirths to alcohol consumption and analysis of postmortem materials; the relationship between alcohol consumption during pregnancy and minimal brain dysfunction in offspring; the effects of alcoholism on family members and ways to reduce family stress related to it; the role of alcohol in traffic accidents; the development of an early screening technique (biomedical and psychosocial) for the early identification of the incipient alcoholic person; the use of an ethanol antagonist or amethystic agent to induce clearance or antagonism of alcohol.

Drug abuse.—Research into: possible gateway behaviors (smoking, drinking, etc.) leading to illicit drug use; drug abuse prevention strategies; the role of parenting practices, family communication skills, and family coping abilities; youth attitudes toward drug abuse.

Driving.—Research into: passive restraint systems; driving behavior in youth; effects of alcohol on driving behavior; road engineering; safer automobiles; driver education in schools.

Exercise.—Research into: exercise and reduction of cardiac risk factors and disease and hypertension; physical fitness and reduction of mental health disorders, alcohol and drug abuse, and smoking; and the relationship between physical activity and aging as it relates to arthritis, respiratory disorders, psychological disorders, hormonal responses, personality and independence, heart disease, work capacity, nutritional status, body composition, strength, flexibility, immobility, and bone calcification and accretion.

Sexuality.—Research into: effective, safe male and female contraceptives; the effects of health education on sexual behaviors; teenagers' perception of birth planning; educational and behavioral strategies that assist couples to enhance their sexual relationships and cope with specific sexual problems, such as frigidity, impotence and premature ejaculation.

Risk management.—Research into: the relationship among risk awareness, lifestyle behaviors, and health status; lifestyle risk indicators for diseases discussed in this report; risk assessment and risk reduction methodologies for individuals, families and communities; effective ways to increase risk awareness and ability to respond appropriately in promoting individual and family health.

Family development.—Research into: life planning, use of leisure time, appropriate career choice, and effective communication for enhancement of family relationships; effect of home and family environment on physical and mental disorders; role of parents and siblings in individual development; the impact of the media on family development.

Coping/stress management/enhanced self-esteem.—Research into: impact of various coping behaviors on health status; coping behaviors associated with successful problem solving; influence of television on individual coping strategies and styles.

b. Data Collection

Many of the research measures discussed above require substantial efforts in data collection. Indeed, data collection is central to any effort to expand the knowledge base for prevention. The United States does not now possess a documented, systematic prevention data base, although a significant portion of needed elements are already in place as subsets in many existing HEW (and non-HEW) systems.

A health information system for prevention would serve a number of purposes. To begin with, we need data on which to base realistic national goals. It is not easy to quantify with precision where we wish to go when we are not sure where we are. Having adequate data to develop appropriate short-term, intermediate, and long-range objectives is essential for planning future prevention programs.

A second purpose for prevention data is problem identification. Careful bounding of a problem's dimensions is needed to manage scarce health resources wisely and to assure that our prevention programs reach those who need them. This suggests a related purpose—risk-group identification. Prevention data should be used to identify target subgroups who are at high risk in order to increase operational effectiveness. In screening programs, the health system does not always obey these "epidemiologic imperatives." For example, pap smear screening for cervical cancer appears not to be directed toward the subgroups at highest risk, by age, socioeconomic status, previous screening status, and other factors; while we repeatedly screen groups which are at low risk.

A third purpose for such a system is the monitoring of progress toward the Nation's prevention goals and strategy targets. In tracking our disease prevention and health promotion efforts, we want to be able to look at the general population and at specific subgroups which are prevention targets, both in cross-section and in trends over time. These are the minimum specifications for an acceptable prevention data set.

A health information system for prevention should also be used for research and epidemiologic analysis and for cost-benefit studies. Its main value will be to suggest lines of research and establish hypotheses for testing. "Sentinel systems (or population observatories) would themselves provide the basis of longitudinal epidemiologic analyses.

Finally, a comprehensive prevention data set would enable us to project chronic disease risks and consequences for the U.S. population and specific subsets of the population. The data should cover at least the following elements.

- Morbidity and mortality for principal preventable conditions.
- Prevalences of behavioral risk factors—e.g., smoking, alcohol use, physical activity, dietary practices.
- Prevalence of environmental risk factors—e.g., occupational hazards, characteristics of the food supply, sales of high-tar cigarettes, toxic substances in the environment, accident risks, etc.
- Prevalence of physiological, anatomical, biochemical, immunological, bacterial, and genetic risk factors for preventable disease consequences—e.g., high blood pressure, obesity, high levels of serum cholesterol, susceptibility to measles, etc.

- Access to, and utilization of, preventive health services—e.g., well-baby visits, immunizations, appropriate screening services, prenatal care, family planning, etc.

This will be a formidable undertaking and should build on existing NCHS and agency data sets, with fine detail being sought through sentinel community data sets. There are currently two basic types of HEW data systems from which a prevention data base could be developed: general purpose statistics, acquired primarily by the various data systems maintained by the National Center for Health Statistics (NCHS) principally, the Health and Nutrition Examination Survey (HANES) and the Health Interview Survey (HIS); and program data sets, maintained by each of the PHS agencies. (The latter are supplemented by program data sets in HCFA, HDS, OE, as well as in such agencies as the EPA and CPSC.) Current Department data collection activities are discussed in greater detail in the following section.

Demands on the existing data systems exceed their capacity even now, and new prevention initiatives are likely to call for additional data. For example, smoking habits and use of smoking cessation services could be included in surveys. Nutritional data are sorely needed and need to be related to health status, particularly the health concomitants of obesity. Both exercise and nutrition data should be interrelated, and linked to measures of general well-being. Screening, access to education and counseling, and adherence to prescribed regimens need to be assessed in relation to hypertension.

A special need in child health is data on mental retardation, birth defects, and genetic disease. This data set should be related to risk factors (e.g., alcohol and FAS), risk groups (e.g., maternal age and Down syndrome), and use of preventive services (e.g., genetic screening, health education, lead screening, rubella immunization, etc.).

Environmental health data should include accidents and injuries, environment-related morbidity and mortality, and sampling data on environmental quality. Health status and environmental data should be epidemiologically related to assess the health effects of environmental hazards. The National Death Register, which will be maintained by NCHS beginning in 1980, is a long-needed epidemiologic tool in this regard.

Occupational health represents an important gap to be filled in existing health data. While the Department of Labor's occupation survey of industries should probably be continued as an overview, it is inadequate for a public health-oriented approach to preventing occupational disease and injury. A surveillance approach, based on physician reports to official health agencies in addition to industry reporting, would extend the current "notifiable" disease approach to this important target area for prevention. Three initial areas in which States could be encouraged to report are: occupationally related injury, respiratory disease and cancer.

Dental disease surveillance data could be expanded to include monitoring of fluoridation status of water and to record preventive dental services delivered in schools.

Data on alcohol-related accidents and their relationship to frequency of alcohol use by age categories will be needed.

There is a clear need emerging to augment the two current sources of data with an entirely new source. It will not be possible, in many instances, to provide adequate refinement of data to guide HEW prevention efforts without placing an intolerable burden on existing multipurpose systems. Moreover, needed linkages of various data sets are not currently available. For example, we have a variety of environmental sampling data—air pollution measures, chemical substances in drinking water, etc.—and we have a variety of data on the prevalence of chronic disease, some of which are presumably environmental—respiratory disease, cancer, etc. We are rarely able to link these data sets to sort out the contribution of environment to disease burden in the community. We are no better able to relate these factors to lifestyle factors, such as smoking, which also contribute to disease. To be truly useful, a system which provides these data would need continuing, long-term (prospective), comparable data on well-defined communities. A sentinel community, or "population laboratory" approach would be useful. Ten communities—perhaps one in each HEW Region—would participate in providing data which would establish with particularity the social and physical environment in which their residents live, their health habits, their use of preventive services, the incidence and prevalence of preventive disease, and identify changes in those indices.

There are several possible locations from which to administer this sentinel community system. NIH has experience with long-term trials with community participation (for example, the Framingham, Massachusetts, coronary heart disease study), CDC can bring medical epidemiological capability to bear, and has both behavioral environmental health program expertise. NCHS has the survey and statistical expertise to bring to the project. Possibly, a consortium approach, with the appropriate States as partners, could be undertaken to carry out this recommendation.

The last point is an important one. In designing an improved national data system for prevention, the role of the States must be carefully delineated in order to strengthen their capabilities in data collection, and avoid excessive duplication of effort.

A final note of caution is warranted. Confidentiality is emerging as an issue entangled in conflicting values—on the one hand, the public's right to know the full scope of governmental activities—on the other hand, the responsibility of the government to protect the public's health through data gathering. Increasingly, hospitals and other health care facilities are becoming unwilling to permit epidemiologic investigations or to participate in voluntary reporting arrangements without assurance of institutional confidentiality. An immediate case in point is data on hospital-acquired infections, an important, preventable public health problem. As currently required by law, CDC must honor public inquiries seeking the identity of any hospital involved in any epidemiologic investigation.

Another potential case could arise from the recommendation that State planning agencies and Health Systems Agencies develop community health analysis mechanisms, to determine the incidence of major preventable morbidity and mortality and to determine systematically how to reduce their occurrence. Again, local health care institutions which would be the source of the necessary data would be more responsive if confidentiality of identity could be assured. A recent U.S. District Court ruling that PSRO confidential profiles of individual doctors and hospitals are subject to public scrutiny under the Freedom of Information Act may set a problematic precedent. As a result, hospital reports of preventable morbidity and mortality might be less complete in the future.

To assure confidentiality to institutions, new PHS Act authority would be required. An amendment protecting the identity of institutions is needed to cover notifications of reportable diseases and conditions and epidemiologic investigations. Such an authority should not protect from discovery an institution which is negligent in its practices; it should authorize disclosure if the institution has consented to it or if the Secretary determines that nondisclosure would constitute a hazard to the public.

c. Cost/Benefit Analysis of Prevention Programs

In the present health policy context, quantitative analysis of the costs, benefits, and effectiveness of possible prevention programs is essential if prevention is to compete successfully for scarce health resources. Basically, benefit-cost analysis addresses the economic gain (or loss) associated with a given program. That is, the total cost to society, both directly and indirectly, of a given disease (or diseases) and related conditions are projected in the absence of the proposed program, and the comparable costs after projecting the program's impact (including the costs of the program itself) are estimated for the same time period. The difference between the two costs is the net savings, or benefits to society, in economic terms. Where that savings exceeds the cost of the program, the benefit to cost ratio exceeds unity; in other words, the investment in the program would pay for itself, in terms of total economic gain to society. While the analysis is not esoteric, it is by no means simple. Poorly executed cost-benefit studies are a disservice, since they either mislead decisionmakers, or lack credibility with the scientific community, or both.

In reviewing the work which has been done in the costs and benefits of prevention programs, several observations emerge:

- It is not meaningful to speak of a benefit-cost analysis of prevention *per se*. Rather, fruitful analysis is best brought to bear on specific prevention programs, or specific interventions.
- Benefit-cost analysis cannot help the decisionmaker decide how much he should allocate to a prevention program, only whether or not the expenditure is worth making. (However, a companion methodology, cost-effectiveness analysis, provides guidance on which of competing approaches to the same objective would produce the greatest effect for a given cost, or would produce a given effect at least cost.)
- Prevention is an area for analysis which offers greater opportunities, on balance, for unequivocal cost-benefit studies than does

medical care. However, some methodologic difficulties are vexing—notably, the fact that prevention deals with events which do *not* happen as a result of a program, and hence, are not countable events. Reliable baseline data and good models predicting impact are essential.

- Relatively few good studies have been done in the area of prevention.

Several interesting benefit-cost studies have been undertaken to substantiate the economic merits of preventive programs in immunization, and some screening programs, such as those for phenylketonuria and for hypertension. But more needs to be done.

Examples of studies which have been proposed include: costs and benefits of carcinogen testing; cost effectiveness of alternative approaches currently or potentially available; costs and benefits of outreach programs using public health nurses and lay community workers to conduct postpartum home visits, assist with parenting skills to reduce postnatal morbidity, and casefinding of pregnant women for prenatal care; costs and benefits of a program to develop centers for training in screening, diagnosis, treatment and counseling for STDs; costs and benefits of programs employing television, radio and the print media to encourage more healthful behavior.

In undertaking any such studies, the following recommendations should be borne in mind (from *Report of the Task Force on Economic Impact of Preventive Medicine, National Conference on Preventive Medicine*):

(1) Benefit-cost or cost effectiveness analysis cannot be used as the sole criterion for decisionmaking in health care programs since these tools are difficult to apply in practice and since issues, such as income distribution effects, are not usually encompassed in the analysis.

(2) Health care programs must be evaluated if we are to realize the full potential of medical care, prevent iatrogenic disease, and contain cost. In particular, benefit-cost analysis can be applied and is an invaluable aid in deciding which programs should be required, financed, permitted, or prohibited.

(3) Therapeutic and preventive health care programs ought to be evaluated by equally critical techniques and judged by the same criteria.

(4) Research and development must be accompilshed to determine the efficacy and costs of proposed programs; in particular, large-scale clinical trials are one of the most important techniques for developing evidence on efficacy.

(5) General health status is the primary measure of efficacy; thus improved measures of health status must be developed and applied.

IV. CURRENT HEW ACTIVITIES AND GAPS

A large number of the activities identified in the previous sections as key Federal strategy elements are already components of HEW programs—and others are found in the programs of other agencies and Departments (next section). But there are gaps. This section reviews current HEW prevention activities and notes prominent gaps.

The initial task of the three work groups of the Prevention Task Force was to develop an analytic framework and apply it to inventories of HEW programs and activities. The inventories of prevention activities were prepared by the six Public Health Service (PHS) agencies (Alcohol, Drug Abuse, and Mental Health Administration [ADAMHA], Center for Disease Control [CDC], Food and Drug Administration [FDA], Health Services Administration [HSA], Health Resources Administration [HRA], and National Institutes of Health [NIH]), the Health Care Financing Administration (HCFA), the Office of Education (OE), and the Office of Human Development Services (OHDS). Budget estimates were made for PHS programs and for certain preventive health services reimbursed under Medicaid and Medicare.

Each of these agencies was represented on one or more work groups, along with the Office of the Assistant Secretary for Planning and Evaluation, the Office of each Deputy Assistant Secretary for Health, the National Center for Health Statistics, and a PHS Regional Office.

The analytic framework and format for each section is different because the nature of the activities inventoried by each work group varied.

The three sections which follow were initially prepared by the work groups, and included in the Preliminary Working Papers reviewed by an Institute of Medicine Conference on Prevention, February 16–18, 1978. Following the Conference, the work groups and agencies revised the inventories as appropriate, and reviewed the estimated resource levels in each area.

A comment on budget figures in the inventory tables is appropriate. These are not accounting data, since agency budgeting and accounting systems were only in rare cases directly translatable to the analytic framework of the inventories. Thus, the data are estimates, projections from known subsets or in some cases professional judgment estimates. In addition, certain definitional issues led to differing interpretations. The most important of these is research, where NIH prevention research estimates excluded certain research which is elsewhere included in the inventories (e.g., studies to elucidate cause of illness). NIH indicates that, were its inventory recomputed with a less restrictive definition, the total budget allocated to prevention would be somewhat increased. In addition, there are areas such as preventive health services reimbursed by HCFA, services and lifestyle activities of OHDS, and lifestyle activities of OE and HSA, in which significant but undetermined prevention resources are expended.

The Department budget components *specifically identified* for prevention breaks down as follows:

	Billion
Health Promotion (Lifestyle)	$0.189
Health Protection (Environment)	.450
Personal Preventive Services	1.180

The total identifiable HEW expenditures for prevention were approximately $1.819 billion in 1977. This includes PHS activities, plus $170 million for identifiable HCFA services. It does *not* include the estimates of other sums from HCFA, OHDS, and OE which are prevention-related but could not be separately identified. The amount would be considerably greater if these sums could be identified. Detailed inventories are presented in the appendixes to this report.

A. HEALTH PROMOTION DESIGNED FOR POPULATION GROUPS

The Lifestyles Work Group of the Prevention Task Force concentrated on the role which an individual can assume in becoming personally responsible for his or her own health. An individual may engage in many healthful practices which decrease potential for illness or promote well-being. The work group analyzed PHS, OHDS, and OE activities and projects which impact on health-related behavior. Agency activities were classified by health behaviors, which were in turn related to the strategy targets presented in section II. The inventories identify a total of $189 million for PHS health promotion and disease prevention.activities related to lifestyle. (Detailed analyses and the lifestyle inventory are included in the appendixes.)

Analysis of HEW lifestyle activities suggests that significant gaps exist in this area. These may result from many causes—lack of legislative authority, failure to recognize opportunities, skepticism about the effectiveness of health education, or inadequate data to support the health effects of some health behaviors. A few additional introductory comments are warranted. A number of health-related behaviors interact and overlap and they would not always be clearly separated in one's lifestyle or in programs which promote the behaviors. In general, there is a stronger effort in those behavioral areas which focus on disease prevention—e.g., cadiovascular disease, malignancies, respiratory disease—than in those related to promotion of general health and well-being. An example is found in the work of the Behavioral Medicine Branch of the National, Heart, Lung, and Blood Institute (NHLBI) at NIH and the NIH-supported Center for Community Intervention on Risk Factors.

The strongest focus is on smoking and drug and alcohol consumption, and these programs appear to be the most progressive in promoting lifestyle change. A few programs in these areas place emphasis on helping individuals and community institutions gain decisionmaking skills and self-help capabilities.

The inventory inadequately reflects the role of epidemiology and statistical analysis in helping the public make informed decisions about lifestyles. It also does not indicate whether the activities incorporated in ongoing programs effectively reach individuals within the target population who are currently healthy or nearly healthy. Finally, it is clear from the inventory that a variety of healthful behaviors are promoted in at least a limited way in a number of PHS programs.

As noted in section III, the Task Force has identified 10 key behavior categories which affect the health status of the individual. In this section, departmental activities to promote and enhance the physical and mental well-being of the public are analyzed for each of these health-related behaviors.

1. Smoking

The CDC provides smoking health education and information in demonstrations and community programs, and the HSA service delivery programs also incorporate education on smoking and health. The OHDS already has several ongoing educational and informational programs which stress the dangers of smoking. Health-related services for pregnant females under Title XX, and Head Start information and education programs for children and their families, are available. Administration on Aging (AoA) health information materials link smoking with heightened risks to elderly persons.

In HEW research activities, the NHLBI's Multiple Risk Factor Intervention Trial (MRFIT) incorporates smoking cessation approaches, and the National Institute on Drug Abuse (NIDA) has initiated a special targeted grants program. CDC demonstration projects and community programs are aimed at youth and other risk groups, both in specific smoking programs and in broader lifestyle approaches. The National Cancer Institute (NCI) investigates the biological effects of cigarette smoking, along with a small amount of research to test the efficacy of various approaches to smoking cessation.

There are a number of significant gaps in the Department's work on smoking. Considerable knowledge has been developed about the health effects of smoking, but too little about the behavioral factors associated with smoking. None of the cessation methods in current use is universally successful. Better knowledge of the types of approaches which work for different smoker groups is necessary. Helping young people make decisions not to start smoking is another obvious priority which needs strengthening. Some experts believe that it is a key to develop ways for young people to confront the smoking decision as a conscious decision, and to equip them with the knowledge and information required to make that decision. The Department had not sponsored a strong, systematic campaign to provide information about the dangers of smoking until

January 11, 1978, when Secretary Califano announced a major new smoking reduction effort by HEW to increase education, research, and regulation. The purpose of this renewed commitment is to provide information to permit American citizens to make a genuinely free choice about smoking and their own health.

2. Nutrition

Overnutrition and undernutrition are related to nine different health status goals. In departmental research activities, the behavioral aspects of nutrition are typically addressed in the context of biomedical research on nutrition rather than as a primary behavioral research target. The various Institutes of NIH identified a variety of nutrition studies and topics, oriented along an organ system/disease axis: cardiovascular, cancer, diabetes, dental health, etc. In addition, several trials, notably in NHLBI, as well as CDC diabetes nutrition education studies and NIH cross-cutting research, are specifically aimed at knowledge of nutrition behavior change and its effects on positive health outcomes. More research attention could be directed toward behavioral aspects of nutrition.

Nutrition education programs also need greater emphasis. The programs currently under way seem to achieve only modest coverage of such high risk groups as children and pregnant women, poverty and health underserved populations, the aged, and diabetics. There is a lack of community-based approaches, except on a clinical trial and demonstration project basis. The CDC School Health Curriculum and the HSA Maternal and Child Health program are especially directed toward schoolchildren; PHS and OE could do even more to pursue nutrition as an aspect of school health. Only the CDC diabetes projects and the maternal and child health grant programs of HSA support nutrition education efforts of State and local health agencies—a serious gap.

Head Start's nutrition program is designed to provide a wholesome and nutritious meal service to its clients and to educate them in the need for a proper diet. In addition, Head Start's education program for parents includes information on nutrition. Similar information is provided under Title XX Day Care. Title XX programs which provide health-related services to young and pregnant females, homemaker services, foster care, family planning and residential care and treatment, also give consideration to nutrition.

In addition to providing low cost meals to elderly persons, AoA's community services program includes information and referral components to help the elderly develop proper nutrition habits. At the present time, the AoA-supported TV series, "Over-Easy," presents a nutrition segment during each program. Several AoA gerontological training, research, and demonstration programs contain information on nutrition.

Despite a fairly large agenda of nutrition-related activities, the Department's efforts need strengthening. Needed are: a better controlled and more systematic approach to nutrition education by departmental agencies; a more concentrated research effort to determine the role of nutrition in chronic diseases; establishment of a major nutrition focus at the NIH; a stronger nutritional surveillance and monitoring system; and a concerted effort to develop departmental recommendations on a set of dietary guidelines for the American people.

3. Alcohol Abuse

ADAMHA's National Institute on Alcohol Abuse and Alcoholism (NIAAA) reported 23 research projects which explore prevention and alcohol-related behavior, focused on alcohol use and burden of disease behavioral factors associated with alcohol abuse, as well as effects on mental development and outcomes of pregnancy. An apparent gap is the continuing inadequacy of knowledge regarding the epidemiology of alcohol use and abuse.

In addition, NIAAA funds a number of projects directed toward early identification of risk groups and development of prevention models. Lacking a clear sense of effective interventions, the PHS agencies have opted for a strategy of demonstrations and incorporation of alcohol information in broader counseling and lifestyle modification approaches. Indeed, many PHS programs listed in the inventory under smoking also address alcohol use.

Title XX services that deal with the social and physical problems generated by the excessive use of alcohol include: counseling; diagnostic and evaluation services; employment services; family planning, information and referral; health-related services; protective services for adults and children; and special services to alcoholics. The nature of the Title XX funding mechanism makes it impossible to measure the precise extent of these services.

AoA information programs stress the relationship between the use of alcohol and the health problems of the elderly. AoA's gerontological training programs include consideration of the health problems of the elderly, including those created or exacerbated by the excessive use of alcohol.

The National Teenage Alcohol Education Program (under OE) will be an integral part of the Department's efforts in preventing alcohol abuse under the leadership of the NIAAA.

4. Habituating Drug Abuse

ADAMHA/NIDA reported 25 prevention projects oriented to lifestyle aspects of drug taking. These projects demonstrate or evaluate a number of health promotion approaches to drug-taking, but there appears to be a major gap in knowledge and understanding of primary prevention of drug abuse. PHS has relatively little current activity designed to enhance the quality of life by encouraging and supporting lifestyles and personal behaviors which do not depend on psychoactive substances. (For FDA activities in drug use information, see risk management, below.)

State services funded under Title XX include: counseling; diagnostic and evaluation services; family planning, information and referral; health-related services; special services to narcotic addicts; and health services to pregnant females.

A significant number of youth (3.8 percent) seek assistance from the National Runaway Switchboard (National Runaway Program) because of an immediate drug crisis; they are referred to an appropriate service agency.

AoA has a number of information services seeking to alert the elderly to the dangers of combining several types of medication/drugs without competent medical guidance.

5. Driving

The Department is currently doing very little related to driving. Only one research study (by ADAMHA/NIAAA) and one health promotion approach (CDC Lifestyle Project) specifically identified driving as a behavioral target. Educational programs for persons arrested for driving while drinking are offered in NIAAA's alcohol treatment programs, which are covered in the appendixes. The limited amount of activity seems to leave an important gap, when compared to the magnitude of the problem.

6. Exercise

The NHLBI studies with Stanford University and the MRFIT centers incorporate physical activity as a behavioral target. However, investigations into the barriers which reduce opportunities or incentives to exercise appear to be a gap in PHS research. Also, although the MRFIT does examine exercise as one intervention, PHS support for evaluating the effect of exercise on health appears to be inadequate. In health information and promotion programs, CDC has fostered physical activity in several health education approaches, and the National Institute on Aging (NIA) has sponsored a conference on exercise and the elderly. The President's Council on Physical Fitness and Sports (PCPFS) is the primary PHS resource for encouraging private sector activity and for information dissemination with six major health information and promotion programs in the area.

The importance of exercise as an essential element in personal health has been recognized in the Head Start Day Care Program. Exercise is also considered an integral part of a sound Title XX Day Care Program. Both programs recognize the role of the parent in providing this essential activity through parent counseling and education. Senior citizens centers funded by AoA provide information on the importance of exercise to the health of the elderly and many centers provide appropriate programs.

7. Human Sexuality/Contraceptive Use

Research in this area is focused predominantly on contraception. HSA programs tend to focus on family planning, while CDC programs deal with education, parenting, and VD education. Important behavioral targets of PHS programs include the relation of sexual behavior to contraception and to sexually transmitted diseases (STD). Both teenage pregnancy and STD have recently been the subject of departmental task forces, and sex education has also been highlighted for PHS action; however, the prominence of sexuality as a factor in the physical and emotional problems of youth may argue for additional PHS efforts.

The National Runaway Switchboard reports that 7.1 percent of its inquiries are sex or pregnancy related. Information and counseling services under Head Start and Title XX Day Care offer assistance to the parents and siblings of registrants. In addition, Title XX includes counseling, information and referral, as well as health-related services in connection with family planning, pregnancy, and teenage delinquency.

8. Family Development

Although a number of departmental projects address parenting, family planning counseling, and research on infant abuse, this area appears to be significantly underdeveloped.

ADAMHA/NIMH sponsors two research projects on infant development and one on child abuse, while CDC, HSA, ADAMHA, and HRA all have small projects directed at a variety of family-related issues.

Various OHDS research, training, demonstration and services programs are directed toward family development in achieving a wholesome lifestyle for individuals.

Both Head Start Day Care and Title XX Day Care have counseling, information and referral services that stress the involvement of parents in the development of the child.

In addition, Title XX family services include: counseling, education and training, employment, homemaker, home management, information and referral, socialization and special services to children, youth and juvenile delinquents. Title XX Child Welfare Services Training Programs focus on the improvement of staff, services, and teaching methods in the area of child and family welfare.

The Administration for Children, Youth and Families (ACYF) funds research and demonstration projects to foster family development; a Child and Family Resource Program which links Head Start and a wide range of community services to assist the enrolled child and the family in coping with family problems; the Preventive Mental Health Project to test new ways to deliver mental health services to Head Start Children. Under its Child Welfare Research and Demonstration Program, ACYF gathers information on the condition of members of the family and seeks to develop various means of impacting positively on the service delivery system to the family members. Further research support is needed to: identify methods to improve supportive family services; replicate and evaluate the findings of the Parent and Child Development Centers; continue to examine the long-term effects of and assess different approaches for early childhood intervention activities; study successful models for improving family-child rearing styles; continue five demonstration projects that address the needs of runaway children and their families; and continue development of comprehensive youth-specific social indicators identifying social welfare status in order to help make better decisions on the use of resources.

In the area of child neglect and abuse, ACYF will develop 28 new demonstrations involving preventive and parental self-referral. These projects will serve approximately 120,000 children.

The National Runaway Program expects that 42,500 runaway and homeless youths will be served in fiscal year 1979, either by reuniting them with their families or by referral for appropriate placement in homelike foster surroundings.

9. Risk Management

The Department sponsors a large number of projects directed at one or another of the components of risk management. Some of the current efforts involve such high-risk situations as suicidal behavior among vulnerable groups (e.g., college youth), but most of the activity seems to relate to specific practices (e.g., symptom recognition, compliance with health regimens, appropriate care seeking, personal hygiene, self-detection, and safe handling of products). Moreover, the focus tends to be identifiable health education messages (e.g., brushing and flossing as a desirable oral hygiene practice) and public information. Although there is a considerable effort to target this information to groups at special risk (e.g., ADAMHA projects for youth, CDC disease control projects, and HSA programs for Indians and other direct beneficiaries, etc.), it is not clear that the right balance has been struck among general programs for consumer health education and other promising approaches. For example, the lack of support for health hazard appraisal programs, except in some PHS employee health programs (CDC, BMS), seems a significant gap, as does the limited emphasis on research to identify and document successful approaches to risk management and its component behaviors. The research into the factors associated with making or not making appropriate decisions on information about one's personal risk factors is especially underdeveloped.

10. Stress Management, Coping/Adaptation, Enhanced Self-Esteem

Stress and related factors such as overwork, underwork, rest and relaxation, remain underdeveloped both as research area and consequently as a health promotion program area. The health effects of stress are viewed by many experts as potentially very significant, but methodological difficulties are troublesome. Epidemiologic studies of stress are a high priority need for developing effective behavioral approaches.

Several health promotion programs in the PHS have attempted to incorporate stress management, coping/adaptation, and self-esteem as target areas. NIDA, in particular, has attempted to develop these approaches for youthful drug users. Fostering innovative approaches, such as self-care, would be one means to increase PHS activities in these related behavioral areas.

Since the early sixties, NIH has supported research and development activities directly relevant to issues of coping and adaptation in a wide variety of settings (normal and abnormal) and in different psychosocial and developmental transitions in the life cycle.

In any health promotion program, coping/adaptation/stress management enhancement should be an integral part of identifying overall risk of developing specific health problems and motivating individuals to reduce that risk.

Research needs include the relationship of stress to such factors as overwork, underwork, and rest and relaxation. Epidemiologic studies of stress are a high priority need for development of effective behavioral approaches.

Several PHS health promotion programs have attempted to incorporate stress management, coping/adaptation, and self-esteem as target areas. NIDA, in particular, has attempted to develop these approaches for youthful drug users. Fostering innovative approaches, such as self-care, would be one means to increase PHS activities in these related behavioral areas.

NIMH has supported numerous projects in different situations of stress of unusual difficulty among vulnerable population groups (e.g., decision-making in high-risk situations).

The goal of facilitating and strengthening coping skills and positive mental health abilities has been implemented in NIMH projects through a focus on self-esteem variables (e.g., sense of efficacy, competence, ego strength).

Various OHDS programs are designed to help people under stress manage their problems and cope with their environment. The programs attempt to prevent physical and mental illness and to promote positive lifestyles. Head Start and Title XX services encourage the development of sound health habits that can help the individual cope with problems of growing and developing. Title XX services also help with such problems as delinquency, teenage pregnancy, drug and alcohol use, dropping out of school and the disintegration of the family. To help families cope and adapt under modern conditions of stress, ACYF funds research and demonstrations related to the cause and prevention of child abuse and neglect. AoA provides services to help solve the problems of elderly persons under stress.

B. HEALTH PROTECTION DESIGNED FOR POPULATION GROUPS

Although the Department has many programs directed toward disease prevention and health promotion, a review of current programs and further examination of the entire environmental problem reveals numerous areas in need either of further study or initial investigation. Therefore, inclusion in this listing does not necessarily mean that there are no programs in the areas mentioned, but rather that the knowledge base must be expanded.

The following presents a brief discussion of activities and programs which are currently being conducted by HEW or which should be considered in an overall prevention program designed to reduce problems related to the environment and to enhance general well-being. Major components of the program are: coordinated planning and implementation of HEW programs, research, strategies to address problems of special and occupational environments, professional training and staffing, education for public awareness, economic incentives for business, surveillance and development of data bases and information systems.

Detrimental environmental factors affect people in many ways. Of particular concern are increased incidences of chronic diseases, communicable diseases, traumatic injuries and deaths, mental retardation and congenital defects, morbidity and mortality associated with pregnancy and the neonatal period, dental disease, diseases related to vision and hearing, emotional disorders, and substance abuse. A positive approach to prevention of environmental effects resulting in these problems should enhance the overall development of children and adolescents as well as provide general physical and emotional well-being for all.

1. Programs

The FDA is the Department's principle research and regulatory agency providing health protection designed for population groups, though a number of other agencies (discussed below) also make significant contributions. FDA's National Center for Toxicological Research (NCTR) undertakes research and testing for potential carcinogenicity, mutagenicity, and teratogenicity. The Bureau of Radiological Health investigates the health impact of microwave, light and sonic radiation, as well as ionizing radiation. It operates a Nuclear Medicine Laboratory in Cincinnati, as well as a Radiologic Health Sciences Learning Laboratory. The Bureau of Foods is the largest FDA office, supporting work in food safety (from the field to the table), in food economics, in labeling procedures, in nutrition education, and in cosmetics. The Bureau of Biologics ensures the safety of blood products, vaccines, and other biologic products, as well as monitoring bioresearch. The Bureau of Drugs provides safeguards related to the development, testing, marketing and prescription of pharmaceuticals, as well as work to improve labeling and patient information procedures. The Bureau of Medical Devices has responsibility for establishing safety standards for medical devices, as well as approving certain categories of these devices. The Bureau of Veterinary Medicine oversees the safety of animal feed, including the use of pharmaceuticals for animals.

The CDC sponsors health protection activities through project grant programs in rat control, lead-based paint poison control, as well as work to improve laboratory investigation, and disease surveillance and outbreak control. The CDC's National Institute for Occupational Safety and Health (NIOSH) provides programs related to workplace safety through its efforts in manpower training, technical services (health hazard evaluation and toxic substances testing), and research (behavioral, epidemiologic, toxicologic).

The NIH sponsors research important to health protection in a number of Institutes. The NCI has programs devoted to the identification of chemicals for carcinogenicity, the discovery of new sources of cancer, the concentration of cancer incidence in certain geographic areas, as well as close surveillance of workers at special risk for certain cancers. The NHLBI researchers the role of toxic substances in pulmonary fibrosis, immunologic disease, and cardiovascular disease. The National Institute of Allergy and Infectious Diseases investigates, the enviromental sources of allergic diseases and the regulation of vectors. The National Institute of Environmental Health Sciences supports work on the prediction, detection, and assessment of environmentally caused diseases and disorders, as well as training manpower in environmental toxicology. Small, but important activities related to health protection may also be found in the National Eye Institute and the National Institute of Neurological and Communicative Disorders and Stroke.

The HSA also provides a number of health protection programs through the housing, sanitation, and pesticide poisoning prevention programs of the Migrant Health Centers, the Community Health Centers, and the Indian Health Service.

2. Gaps

a. Planning and Implementation of Departmental Programs

Planning and implementation of HEW programs related to prevention of environmental health hazards requires establishment and/or strengthening of relationships with other Federal agencies having environmental health responsibilities. It is tremendously important that the Department's research and testing activities be responsive to the needs of the regulatory agencies. To this end, the Interagency Regulatory Liaison Group (FDA, Environmental Protection Agency [EPA], Occupational Safety and Health Administration [OSHA], and Consumer Product Safety Commission [CPSC]) has been established to coordinate planning and program implementation by these four agencies.

b. Research

A review of present programs indicates that the emphasis has been in the area of research. Many of these programs must be continued and new ones developed in order to provide additional solutions to expanding health problems related to the environment. Areas requiring particular attention include the role of toxic substances in chronic diseases, such as respiratory diseases, abnormalities due to carcinogenesis, mutagenesis, and teratogenesis, cardiovascular disease, and the behavioral effects of environmental factors. The NIH (NIEHS, NCI, and NHLBI), the FDA (NCTR), and the CDC (NIOSH and Chronic Diseases Section), all play prominent roles in toxic substances research and testing (total of about $47 million in HEW in fiscal year 1979).

- *Respiratory diseases.*—Respiratory problems associated with cigarette smoking are generally well known. However, evidence indicates that occupational factors, alone or in combination with smoking, significantly affect other respiratory diseases generally not considered occupational in origin. Therefore, there is need for much better early identification of respiratory disease causal factors for fundamental and clinical research to elucidate the etiology and pathogenesis of environmentally induced or exacerbated respiratory disorders and for early control with special emphasis on the occupational settings.
- *Carcinogenesis, mutagenesis, and teratogenesis.*—Although some rapid screening tests for carcinogens are under development, further development and validation of these test methods should be supported. A small effort on this problem has included search for mutagens in the urine, and examination of circulating lymphocytes for chromosome damage or evidence of stimulation of DNA repair. There are theoretical reasons to think that other approaches to this problem may be feasible, and a major expansion of research in this field is needed. Reference to the inventory indicates that some studies are in progress, including research projects on environmental mutagenesis, research in testing of chemicals for carcinogenicity, research and educational studies of behavioral factors, and information programs on occupationally-associated cancer.

  Recently there has been marked expansion of research in mutagenesis with development of a variety of new assay systems. Most of these have used lower organisms. Additional research is needed to develop practical methods for identifying mutagens in mammals with specific emphasis on reducing the large number of animals presently needed to achieve sensitivity. Improved techniques are also needed for detecting mutations in somatic cells with the hope that this would permit identification of exposure in humans before the damage has been irreversibly passed on to the next generation. Further research is needed to extrapolate laboratory data to humans in order to improve the process of assessing risk.

  Some research is under way in environmental mutagenesis and reproductive toxicology with respect to toxic substances, biologic hazards, foods and drugs. However, potential hazards to working parents and the fetus, including teratogenic and mutagenic effects associated with occupational exposures must be considered in greater depth. Since most carcinogens are also suspected of being mutagens, the magnitude of this problem is substantial and has social as well as scientific implications. For example, in lieu of adequate industrial engineering control, women of childbearing age may be transferred or excluded from jobs which could result in exposure to toxic agents because of concern for the health of the developing or as yet unconceived fetus. This action presents a conflict between the competing national goals of equal employment opportunity for women and protection of worker health. At the same time, toxic effects on reproduction through male occupational exposures must be evaluated.

Psychosocial influences on embryology and morphogenesis should be considered also. Evidence exists which demonstrates effects of various external stresses on fetal development. More research is needed, including among other things, studies designed to clarify the effects of different maternal emotional states on morphogenesis and on fetal physiology.

Among current PHS research projects investigating some aspects of this problem are environmental studies to improve identification, detection, and specific toxicity of environmental substances, and basic and applied studies in mutagenesis, biology and chemistry primarily concerned with understanding hazards from exposure to toxic substances.

In addition to what is ordinarily considered as teratology, research must consider the effect of environmental agents on the development of normal physiology and biochemistry subsequent to the period of organogenesis in utero. For example, there is experimental evidence that neonatal exposure of rodents to steroid hormones affects their sexual behavior throughout life and evidence in humans that exposure to certain anesthetic gases has resulted in spontaneous abortions and exposures to dibromochloropropane has caused sterility in males. More must be learned about mechanisms of classical teratogenesis.

- *Cardiovascular diseases.* Cardiovascular disease is the Nation's largest killer, but too little research has been directed toward elucidating effects of socioeconomic and occupational factors. The impact of inadequate living conditions, stress, physical agents, and chemical exposures, including solvents, sulfur oxides, halogenated organics, and trace metals or in combinations of these factors upon cardiovascular disease and hypertension is largely unknown.

  There is an urgent need to develop clinical test methods that can be used to identify individuals or population groups being exposed to chronic hazards long before a disease state has developed, so that exposure can be controlled. Moreover, there is a need to understand the process of disease so that the impact of preventive intervention may be assessed.

c. Problems in the Community and Home Environment

Special environments, such as the home, neighborhood, school, hospital, and general outdoors, influence the populace with respect to communicable diseases, injuries, mental illness, drugs, and alcohol. The inventory indicates current work in these areas through projects on disease investigation, surveillance, and control; rat control; lead-based paint, family disintegration; special mental health projects; and several others. Additional problems of these environments which must be addressed are discussed briefly below.

Prevention and control of the spread of disease demands our continuing attention. Much is being accomplished by epidemiological surveillance and immunization programs. Water treatment and sewage disposal presents an ever-increasing challenge. Many small towns face the dilemma of finding it impossible to conform to new standards because of the tremendous costs involved in establishing and maintaining adequate systems.

There is need to continue and increase efforts to prevent or curtail effects of disease spread by insect and animal vectors. Community improvement projects can contribute to rat and mosquito control programs and should be supported by public funds.

Removing lead from air, dust, homes, and food is an urgent public health need. Excess lead in the human environment is man made and, therefore, preventable by man. Sources of lead must be detected in the environment, not in children, and removed. However, until all sources are known and resources become available for their removal, the addition of more lead should be terminated where possible and all children in the age when the development of the brain is greatest should be screened. To reduce risks, an intensive search for the source of lead should be undertaken.

Although injuries are the fourth most frequent cause of death, current PHS activities concerned with understanding causes and preventing injuries are still minimal. There are several poisoning prevention programs, including a small pesticide poisoning prevention program for migrant workers covering exposures from toxic substances, air, and water, as well as a program to collect and analyze case reports and supply local poison control centers with information on toxicity and treatment of poisoning caused by household chemical products and medicines.

The storage and transportation of nuclear wastes, and reduction of radiation exposure hazards, in general, have become important issues in many communities. A coordinated national approach is desirable to permit examination of the adequacy of existing protections.

There is need for the development of a national, coordinated public health emergency response system as well as an applied research program emphasizing prevention of injuries and promotion of environmental safety. Research resources should be coordinated with public service organizations (National Safety Council, American Society of Safety Engineers, American Industrial Hygiene Association, etc.), educational institutions and other government agencies.

Additional support is needed to conduct increased program activities in the fields of housing hygiene, youth camp safety, recreation and swimming pool sanitation and related areas of environmental health.

Reduction of dental disease through environmental approaches is accomplished primarily by community water supply fluoridation. At present, departmental activities being undertaken are mainly concerned with determining the status of fluoridated water systems, providing technical assistance to local communities when requested, and conducting a limited public awareness and education program.

Ultraviolet light damage to the lens and retina is an environmental hazard that can be present in the home or workplace. Studies are needed on the effects of ultraviolet and other forms of radiant energy and ultrasound on the eye. It is also important to conduct research on how atmospheric pollutants and other environmental chemicals affect the cornea and conjuctiva. Of particular interest is the role of the tear film in combating potential toxic responses.

Considerable research must be conducted on transmission vectors and reservoirs of the pathogens and on the pathogenesis of infectious ocular diseases caused by parasitic, microbial and fungal micro-organisms.

The impact of noise pollution on hearing is another important area requiring attention.

The effect of the neighborhood, changes in employment patterns, child care practices, population shifts, family makeup and breakup, all are variables which affect the functioning of the family and its capacity to provide a healthy environment. While much is known about these forces, additional research is needed about the family and its relationship to health or conversely individual dysfunction and illness.

More information is needed on psychological stress as a casual factor in mental and emotional problems, accidents, suicides, drug overdose, alcohol and drug abuse in the workplace and home.

Current substance abuse projects include community prevention techniques and training. Further study of community policy and attitude on alcohol consumption is needed. While current drug abuse projects tend to focus on the individual and on acceptable alternative forms of behavior, the physical and social environment also influences drug use and abuse and warrants further research.

Therapeutic drug dosing for children requires special attention. Methods to establish criteria for safety and efficacy of pediatric drugs need to be developed.

d. Occupational Environment

An adequate surveillance system for the identification of hazardous exposures and assessment of their potential adverse effects does not exist. The National Occupational Hazard Survey provides some information but should be supplemented by ongoing surveillance. We need to investigate overall effects of toxic exposures, dose response, and effective medical management of exposed persons. Special emphasis should be placed on hazards for pregnant women.

Subtle behavior changes due to chronic exposures of adults to chemicals on the job may be important, but more needs to be known of the possible extent of this health problem. Unemployment and lack of job satisfaction have also been linked to emotional problems.

Occupational health programs in HEW include research, development of criteria documentation in support of Department of Labor standards, health hazard evaluations of the workplace, technical information dissemination, quality control, and manpower development and training. Mining health research and standard setting has recently become an HEW responsibility.

e. Professional Training

Professional education and training programs are critical to the future availability of manpower with the skills and knowledge required by the growing problems of environmental health. Additional resources are needed for systematic identification of performance problems and implementation of effective training solutions.

A major CDC effort is under way to correct the shortage of qualified occupational safety and health professionals. More occupational medicine specialists are needed, along with industrial hygienists, safety professionals, and occupational nurses.

Other disciplines need additional PHS manpower activities to meet environment health needs, especially epidemiology, pathology, toxicology, and environmentl health sciences.

f. Education for Public Awareness

Properly informed individuals and communities may be able to influence the course of hazardous processes caused by the presence of environmental agents. Consequently, more attention should be given to creating an awareness among the general population of the ways in which they can exert a positive effect on the prevention of disease and promotion of good health. Multieducational approaches must be developed and initiated to have a better informed public and to allow them to make personal choices and initiate individual or collective preventive measures.

g. Data Bases

There is a need for a National Environmental Data Registry which would collect and catalog information on contaminants in various exposure sources such as air, water, food, drugs and other commercial products as well as information on contamination of various environmental settings such as the home, institutions, health care settings and the workplace. The system should require regular input from health scientists who are most concerned with the uses of environmental data.

It should make high quality data, usually obtained at great cost, available to a wide number of users including health scientists, officials of regulatory agencies, State and local governments and to the private sector.

In addition to data on contamination, the system should contain information on injuries. This would aid in the identification of common and unusual patterns in injury occurrence, psychological determinants, geographic differences or similarities and would be an essential step in developing countermeasures and control techniques.

Finding a balance between the individual's rights to privacy and confidentiality of medical records, and the public need to have adequate information on the health consequences of environmental exposures, is an important issue. Access to Social Security and other Federal information sources, tumor registry and death certificate coding with occupational data. State surveillance data systems, and industrywide uniform medical data reporting systems are all important gaps in the current data base. Linkage of environmental monitoring systems and health effects systems would greatly improve data utility.

C. PREVENTIVE HEALTH SERVICES PROVIDED TO INDIVIDUALS

The Work Group on Services of the Prevention Task Force analyzed HEW expenditures for five PHS agencies—ADAMHA, CDC, FDA, HSA, and NIH—as well as HCFA.

Of a total budget of over $37 billion in fiscal year 1977, six agencies spent at least $1.1 billion (or 3 percent) on preventive health services. This figure is underestimated, since it includes only a portion of preventive services expenditures by HCFA and does not include funding estimates for a number of prevention-related elements of programs in OE and OHDS.

The work group identified a number of issues which influenced their analysis: the difficulty of allocating expenditures to preventive activities rather than discrete programs; the definitional difficulty in separating preventive services from mainstream medical care; and areas of overlap between services programs and both environment and lifestyle activities. The inventory data are thus a function of individual agency perceptions of these issues.

The work group analysis and the services inventory are presented in detail in the appendixes. The remainder of this section is a brief discussion of each agency's major preventive health service programs, and an analysis of gaps in current efforts.

The HCFA figure is underestimated, primarily because it does not include most "well person" care that takes place during physician visits paid for by HCFA. Medicaid has no such constraint, but the poor often receive only crisis-oriented care because of lack of providers, lack of knowledge, and discrimination. HCFA expenditures for the Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program and for family planning are included in the $1.1 billion.

1. Preventive Health Service Expenditures—by Agency

a. Health Services Administration

Total fiscal year 1977 budget	$1,563,000,000
Preventive services (estimated)	570,000,000

- *Bureau of Community Health Services (BCHS).*—Grant programs provide comprehensive primary care, often including outreach, screening and health counseling (Community and Migrant Health Centers; Maternity and Infant Care and Children and Youth projects; National Health Service Corps sites; Health Underserved Rural Area projects; and the Appalachia Regional Commission projects provide direct care and health education.
- *Indian Health Service.*—IHS is the primary health resource for approximately 700,000 American Indians and Alaska Native people living on or near Federal Indian reservations or in traditional Indian country such as Oklahoma and Alaska.

- *Bureau of Medical Services (BMS).*—The Emergency Medical Services (EMS) Division provides for the arrangement of effective delivery of medical care services under emergency conditions. Preventive aspects of the program include training of health personnel, central communications and information systems, setting performance standards, coordination, and training in the medical care system.

b. Alcohol, Drug Abuse, and Mental Health Administration

Total fiscal year 1977 budget	$954,000,000
Preventive services (estimated)	87,000,000

- *National Institute on Alcoholism and Alcohol Abuse.*—NIAAA provides for research, training, dissemination of information, and grant programs for prevention and treatment of alcohol abuse.
- *National Institute on Drug Abuse.*—NIDA provides for research, training, dissemination of information, and grants for community mental health centers providing a range of prevention and treatment services.

c. National Institutes of Health

Total fiscal year 1977 budget	$2,542,000,000
Preventive services (estimated)	270,000,000

- Research and demonstration activities related to primary and secondary prevention of disease and disorders by 11 Institutes and 7 supporting divisions, organized by type of condition.

d. Center for Disease Control

Total fiscal year 1977 budget	$179,000,000
Preventive services (estimated)	86,000,000

- Epidemiological and some clinical research, dissemination of information; diagnostic aid.
- Pilot community programs in diabetes control.
- Grant programs providing disease prevention services for specific problems—e.g., immunization; veneral disease.
- Programs for disease surveillance and technical support, working in and with State and local health agencies. Examples are: immunization, sexually transmitted diseases, tuberculosis control, information retrieval and storage, training in prevention, and general epidemiologic information and technical assistance.

e. Food and Drug Administration

Total fiscal year 1977 budget	$275,743,000
Preventive services (estimated)	700,000

- Poison control project to respond to calls for toxicity information.
- Vaccine development and licensure, and control over other biologic agents used to control or prevent disease (included in health protection inventory).

f. Health Care Financing Administration

Total fiscal year 1977 budget	$32,100,000,000
Preventive services (estimated)	170,000,000

- Medicare, which reimburses providers of health services to the aged and disabled, covers some preventive services in the course of paying for physician visits. It is not possible to isolate these expenditures.

- Medicaid covers well-child and well-adult care, family planning, and some other preventive services in the course of matching State expenditures for reimbursing providers of health services to the poor. Only family planning expenditures have been isolated.
- The EPSDT program for Medicaid eligibles under 21 pays for outreach, child health screening and followup. These expenditures can be estimated separately from other Medicaid payments.

g. Office of Human Development Services

Total fiscal year 1977 budget	$4,986,862,000
Preventive services (estimated)	1,166,802,677

- *Administration for Children, Youth, and Families.*—ACYF supports Head Start programs to provide developmental services, research and development, information and referral, career development, technical assistance, and training; conducts Child Welfare Research and Demonstration projects to support the family as the primary unit for child and youth development; provides grants and contracts to help improve and increase National, State, community, and family activities for prevention, identification, and treatment of child abuse and neglect through research, demonstration, evaluation, information dissemination, technical assistance and training.
- *Administration on Aging.*—AoA provides grants to State and community agencies responsible for planning for the needs of the elderly, grants to services agencies; model projects; nutrition programs; research and training in gerontology; and support for the Federal Council on Aging and the National Clearinghouse on Aging.
- *Rehabilitation Services Administration.*—RSA provides basic State grants, service projects, and research and training funds for vocational rehabilitation, discretionary and formula grants to States, and information and referral for developmental disabilities.
- *Administration for Public Services.*—APS provides for research and evaluation projects to develop knowledge, data, and techniques to improve the delivery of publicly financed social service programs and to evaluate these programs.

2. Preventive Health Service Activities and Gaps—by Health Status Goal

This section summarizes briefly current efforts and gaps in preventive health services within the HEW, with particular emphasis on the gaps. A more complete summary of the activities can be found in the appendixes. For convenience, activities and gaps are grouped according to the 12 health status goals set out in section II of this report.

a. Reduced Incidence of Chronic Disease

The primary targets for prevention activities in this area are the major killers—heart disease and stroke ($33 million), cancer ($38 million), diabetes ($15 million), and respiratory disease ($4 million). In addition to supporting research in such areas as risk determination, cause, early detection, diagnosis, and prevention of *cardiovascular disease* (including congenital and rheumatic heart disease), NIH disseminates information on hypertension and heart disease. Both HSA and NIH are involved in service programs for hypertension. Work is needed to develop techniques to improve patient adherence to treatment regimens.

In the *cancer* area, the NIH provides services for control and detection of cancer, including thermography, mammography, screening for cervical cancer and malignant melanomas. It also provides technology transfer to improve screening and diagnostic services and conducts an extensive public information campaign. BMS and BCHS also provide cancer screening. Better measures are needed to identify high risk groups. Improved targeting for postmenopausal cervical cancer screening services is also needed.

For *diabetes,* NIH research includes efforts to determine factors that cause, slow down, or prevent the emergence of diabetes, and studies of diabetes in pregnancy. CDC conducts pilot diabetes control programs and HSA has a small IHS activity. Using traditional public health disease control approaches, the CDC has instituted a program to contain diabetes morbidity and mortality, and through coordination and evaluation of divergent health care resources, improve services to persons with diabetes and their families. Under contract, 10 State health departments will obtain morbidity and mortality information to characterize existing health care services, and to organize a statewide advisory committee to use this information in developing plans for improving services to persons with diabetes.

In the area of *respiratory diseases,* research efforts are aimed at early detection of and intervention in fibrotic and immunologic respiratory disease, and adult and neonatal respiratory failure. A much better understanding is needed of the etiology of all chronic lung diseases—particulary the coal miners' "Black Lung."

Schizophrenia ($16 million) affects some 2 million Americans, more than 100,000 of whom are institutionalized. While research efforts continue to focus on the value of somatic treatment in the remission of symptoms—particularly the comparative value of short- and long-acting neuroleptic drugs—increasing attention is being paid to psychosocial intervention, both alone and in combination with somatic approaches. Although service programs focus on rehabilitation and support for discharged schizophrenics in such settings as halfway houses and family care homes, more effective treatment of discharged schizophrenics is needed to meet the goal of reducing the rate of return of discharged patients to State and private institutions. NIMH currently has a 16-State project directed to this end.

In *general chronic diseases* ($35 million) NIH supports and conducts research in urologic, digestive, arthritic, neurologic, bone and skin, and liver conditions. A major gap is the need for a comprehensive strategy to screen adults for major chronic diseases. Some tests should be available from all health providers and be reimbursable under Medicare and

Medicaid. Tests aimed at high risk groups should be used where significant benefits can be obtained in relation to costs. In addition, all primary care programs funded by the Department (e.g., BCHS, IHS) should have the ability to provide outreach, transportation where needed, community-wide screening for target conditions, and preventive and health maintenance counseling. Not all programs currently have this capability.

b. Reduced Incidence of Communicable Disease

Immunization ($91 million) represents the major thrust of the HEW's prevention efforts in the area of communicable disease. In addition to epidemiologic studies, research into the pathogenesis (bacterial and viral), and the development and testing of vaccines, NIH and CDC disseminate information of the results of their investigations. CDC also pays for and distributes vaccines and provides grants to States for immunization programs. HSA's major health service delivery programs (e.g., Maternal and Child Health, Children and Youth, and Family Planning) also provide immunizations.

In 1977, HEW launched the Childhood Immunization Initiative to correct a situation in which 20 million of 52 million children under 15 years of age were not adequately protected against such childhood diseases as measles, rubella, mumps, polio, diptheria, tetanus, and pertussis. The goal of the initiative is to raise immunization levels to 90 percent of the under 15 population and to establish a system that will assure the protection of newborns at the earliest possible time.

Another gap involves the identification of high-risk groups for non-childhood diseases (e.g., influenza in the elderly) and improving service delivery to such groups. HEW has proposed a grant program to increase influenza immunizations among high-risk groups.

Sexually transmitted diseases ($37 million) constitute a major infectious disease problem facing the United States today, affecting more than 10 million persons (most of them under 25 years of age) each year. The main thrust of the HEW effort in this area is CDC's VD control program through which CDC provides funds and manpower to States for casefinding, screening, and diagnostic services for syphilis and gonorrhea. The BCHS and BMS also provide for sexually transmitted disease prevention in their constituencies. A relatively small emphasis is currently placed on other diseases that can be transmitted sexually, including trichomoniasis (some 3 million cases annually), nongonococcal urethritis (2.5 million cases annually), and genital herpes, for which there is no effective treatment and which may be a precursor to cervical cancer.

HEW is currently developing a strategy to deal with the problem of sexually transmitted diseases; however, the gaps are many. We need to improve and expand existing screening and diagnostic services to make them more attractive to the high-risk populations that need them most (e.g., adolescents, homosexuals, persons with recurrent gonorrhea, etc.) and to improve information services, not only for the public but also for health professionals at every level. Research needs include development of rapid and inexpensive screening tests, particularly for gonorrhea and herpes II, investigation of the mechanisms of penicillin resistant gonococci, and the development of vaccines for gonorrhea and herpes II.

Efforts related to *other communicable diseases* ($49 million) include studies on bacterial diseases (including tuberculosis) and parasitic and viral diseases. CDC is conducting a major study of hospital-acquired infections, which cause an estimated 29 million additional days of hospital stay annually. CDC provides laboratory services for diagnosis of all communicable diseases upon request of public health officials, and also supports epidemiologic surveillance and investigation of disease outbreaks, as well as training of health professionals in the area of prevention.

c. Reduced Incidence of Traumatic Injuries and Deaths

Current efforts ($11 million) in this area include FDA's support of 580 Poison Control Centers and HSA's EMS project, which is developing a network of basic and advanced life support systems in partnership with State health agencies. Research efforts include the development of methods for expediting care of traumatic injuries.

Both the poison control and EMS efforts need to be expanded to cover more of the population, and current information efforts, including training programs for the general public in such areas as cardiopulmonary resuscitation and the Heimlich maneuver (to prevent choking), also should be expanded. There is also a need for prevention programs to reduce injuries in the home and recreational settings. ACYF needs to design methods to provide comprehensive emergency services to families in crisis.

d. Reduced Incidence of Mental Retardation and Congenital Defects

In the area of metabolic disorders ($10 million), research studies include the role of nutrition in the development of defects in the growing fetus and in the management of metabolic disorders in those identified as being at risk. HSA programs support some screening and treatment of these conditions—e.g., phenylketonuria. The major gap in this area is in the availability of screening and treatment programs. Despite ongoing programs, several hundred infants born each year develop abnormally because preventable metabolic defects such as hypothyroidism go undetected in the newborn period.

In addition to NIH-supported research relating to early detection of *chromosomal abnormalities* ($5 million), detection of asymptomatic persons carrying traits, and procedures to restore function lost because of abnormality, CDC conducts research into the value of amniocentesis in the detection of such chromosomal abnormalities as Down syndrome.

HSA provides funds for screening and genetic counseling, but the techniques available to identify a growing number of serious defects either prior to pregnancy or early in fetal life are not applied to all high-risk women.

Research in *blood disorders* ($14 million) includes such conditions as sickle cell disease, hemophilia, and Cooley's anemia, as well as hemolytic disease from Rh factor. NIH also provides information on genetic counseling methods, while HSA provides genetic counseling for sickle cell disease and hemophilia.

There are a number of important gaps in this area. In addition to better application of existing techniques, we need improved diagnostic tests—e.g., a test for detecting carriers of hemophilia and improved techniques for sampling fetal blood for the prenatal diagnosis of genetic blood diseases. There is also a need for improved genetic counseling and public information programs, particularly concerning Rh hemolytic disease, which is preventable. Since this prevention depends on the immunization of the affected mother at the time of her first pregnancy, as well as each subsequent pregnancy, the immunizing factor should be administered in abortion clinics as well as in hospital obstetric services.

Although *mental retardation* ($4 million) can be caused by environmental or lifestyle factors, some—including retardation caused by infection or fetal alcohol syndrome—might be prevented by personal health services. NIH studies include investigation of such causes as natural infections and infections at birth, and the management of neurological disorders.

The most critical preventive service need in this area at present is probably in idiopathic retardation, the most common diagnosis in mental retardation and one which is associated with low birth weight and low maternal age.

Research needs include study of the role of infectious agents, genetic and inborn errors of metabolism, and psychosocial factors causing mental retardation. We also need a better understanding of the mechanisms of trisomy formation, with the goal of primary prevention of Down syndrome.

e. Reduced Incidence of Morbidity and Mortality Associated With Pregnancy and the Neonatal Period

Current efforts in *family planning* ($294 million) range from contraceptive research, including the development of long-acting agents for both sexes, to public information programs and genetic counseling for prospective parents. The major expense is for family planning services provided by BCHS under Title X of the PHS Act. HCFA encourages family planning by matching State medicaid expenditures for such services at a rate of 90 percent rather than the usual 50 to 78 percent.

A major problem in this area is the increasing number of teenage pregnancies. Of 10 million teenage women, 1 million become pregnant annually and 600,000 bear children. HEW's Teenage Pregnancy Initiative is just getting underway with some funds appropriated in the fiscal year 1978 budget and a total of $142 million budgeted for fiscal year 1979. The money would be used to increase funds for research, information, medicaid and BCHS services, and for a new $60 million program to coordinate delivery of health and social services.

Other needs include safe, effective, inexpensive, easy to use, and acceptable contraceptives for both sexes; a better understanding of the patterns and determinants of infertility; and study of the long-term effects of oral contraceptives and intrauterine devices.

In *prenatal and perinatal* care ($158 million), NIH research is aimed at prevention of complications of pregnancy, particularly in adolescents, at prevention of premature and low birth weight infants, and of newborn disorders, including infantile respiratory distress syndrome. Improved techniques for neonatal intensive care are also being studied.

The most important need in this area remains universal availability of prenatal care, which has a profound impact on maternal and child health. Ten percent of all women giving birth in the United States have not had prenatal care, and the proportion is much higher among the poor, teenagers, and migrant farmworkers. HEW has put some additional resources into BCHS delivery programs, but despite current initiatives, some 4 million women with incomes under the Federal poverty level will remain uncovered by medicaid, and some 22 million women in medically underserved areas lack access to continuous, high quality care.

Sudden Infant Death Syndrome (SIDS) ($4 million) is the leading cause of death for American infants during the first year of life. Research efforts are aimed at identifying the etiology and underlying mechanisms, and identifying high-risk infants to facilitate development of preventive measures, including home monitoring techniques. Nevertheless, SIDS remains an unsolved problem and additional effort will be required to identify its cause.

f. Reduced Incidence of Dental Disease

Departmental activities to prevent *dental problems* ($31 million) include research into the development of new agents, sealants, and vaccines to prevent dental caries; prevention of periodontal disease, including professional prophylactic services; and prevention of oral cancer, including studies to facilitate early detection. HSA and CDC provide or encourage delivery of dental disease prevention services and information. Community water fluoridation, school water fluoridation, and other fluoride supplements were discussed under "health protection." Alternative programs could be provided through families and schools. Preventive dental services could be required under medicaid, and certain preventive services could be provided in schools.

g. Reduced Incidence of Disease Related to Vision and Hearing

Current efforts in prevention of *hearing and vision disorders* ($36 million) involve the detection of diseases and developmental disorders that result in hearing or communication problems; identification of dyslexia; understanding the fundamental processes of vision and their derangement in diseases of cornea, retina, and choroid; and understanding visual impairment resulting from sensory and motor disorders. Improved screening services for hearing and vision disorders constitute a major need. For example, glaucoma screening services should be expanded, and hearing screening should be provided to all children by age 3.

h. Reduced Incidence of Emotional Disorders

In the area of *emotional disorders* ($67 million) research is directed at increasing our knowledge of mental illness and emotional disorders and at such special problems as crime and delinquency and the elderly. Particularly important is work directed to improving services to prevent depression, which was noted earlier in the report to be a problem for nearly 5 percent of the population and a factor in 80 percent of suicides. NIMH spends approximately $11 million on research into depression, including a major 10-center collaborative study.

Despite the wide variety of preventive services offered through the NIMH-supported Community Mental Health Centers (CMHC) and HSA projects, there is still a need to identify and pursue ways of reaching groups who have limited access to mental health professionals (e.g., the poor, minorities, etc.). More mental health services could be provided in such other health care settings as HMO's and Community Health Centers.

i. Reduced Incidence of Alcohol and Drug Abuse

Work on prevention in *alcohol abuse* ($6 million) includes research on the effect of alcohol abuse on health, fetal alcohol syndrome, the development of a primate model, and a demonstration project to evaluate combinations of preventive approaches. In alcohol services, ADAMHA programs are aimed toward occupational alcoholism and toward the drinking driver. In addition, CMHCs offer a wide range of services related to the prevention of alcoholism. There are two areas in which services fall short: alcoholism among women and problem drinking among adolescents. These problems are currently being studied by an HEW task force.

ADAMHA is developing a nationwide program to improve dissemination of information about fetal alcohol syndrome. Although the major focus of *drug abuse* ($6.75 million) preventive services, information, and research is directed at youth, attention is also paid to the problems of the elderly and of general misuse.

The major need is to identify what strategies work best for what group of people at what effectiveness and at what cost. There is a need for improved coordination with other health, education, and social services aimed at youth. Matching of client to service is important to ensure early intervention, at which has the best hope of decreasing the severity and frequency of more extensive drug abuse problems.

One useful research goal might be the development of simulations or other forecasting models to anticipate the impact of changes in unemployment, level of poverty, or alternative retirement requirements on drug use.

j. Enhanced Development of Children and Adolescents

Well-child care and preventive health and social services constitute an expanding focus for HEW efforts to *enhance the development of children and adolescents* ($207 million). HEW activities in encouraging preventive health care for children, rather than episodic or no care, are provided by HCFA (EPSDT outreach, screening the followup) and HSA (BCHS comprehensive primary care programs and IHS and BMS emphasize well-child services). Exclusive of EPSDT, Medicaid also pays for unknown amounts of well-child care. The OHDS is expanding its preventive health and social services to children in fiscal year 1978 and fiscal year 1979. Within Head Start, for example, the immunization effort is being expanded to include siblings of Head Start children (as well as other children in the neighborhood) and two demonstration models to provide mental health services.

The most important problem in this area is the large number of children who lack a continuous source of health care. Many, if not most, of these children are poor. Yet EPSDT reaches fewer than 2 million of the 12 million Medicaid eligible children annually and an estimated 4 million poor children are not eligible at all. EPSDT has had difficulty promoting continuous care for those children who are screened, and BCHS comprehensive care programs are able to reach only a small portion of children in medically underserved areas. To deal with some of these problems, HEW has proposed a Child Health Assurance Program (CHAP). CHAP would extend Medicaid and EPSDT coverage to another 1.3 million poor children and encourage States to screen and treat more eligibles. CHAP should include a developmental assessment protocol which would serve to detect emotionally and mentally disturbed children and refer them for appropriate treatment.

A comprehensive care setting can be effective in ensuring provision of preventive services. HEW's primary care programs aimed at poor and underserved populations should be expanded, especially where there are large numbers of underserved children. As with chronic disease prevention, these programs should have the ability to provide outreach, transportation where needed, screening, followup treatment, and counseling.

There is a growing body of scientific literature which indicates that early detection and treatment of emotional problems in children can facilitate their healthy growth and development. Most emphasis has been placed upon the physical development of a child. A parallel emphasis should be extended to the psychosocial development process.

k. Enhanced General Physical and Emotional Well-Being

Although much of this effort has to do with "wellness" and health promotion approaches addressed by lifestyle programs, two aspects—nutrition and the health status of the elderly—warrant additional discussion in the context of preventive health services.

Efforts to reduce the incidence of *disorders related to malnutrition* ($6 million) that are not related to other health status goals or a particular condition include work done by NIH, CDC, and HSA, and nutrition counseling provided by various BCHS programs.

Expansion of research is needed to determine needed nutritional services and their acceptability to people they are designed to serve. Nutritional services should be part of every health care delivery system. The Department of Agriculture's Supplemental Food Program for Women, Infants, and Children (WIC) and the PHS service programs for mothers and children need much closer linkage at the national level.

In efforts to improve the *psychological, social, and medical status of the elderly* ($30 million), NIH has ongoing programs aimed at identifying nutritional, social, and medical problems of the elderly, understanding senility and increased susceptibility to disease. New programs are aimed at alleviating certain problems of physical disability by use of prosthetic devices.

All HSA organizational units provide services to the elderly in their comprehensive care programs. Linkages are developing with other agencies and programs, such as HDS, which is expanding its services to the elderly through the AoA.

The HDS expansion will mean improved services to prevent physical and mental illness and promote the well-being of the elderly. Also, it will increase the opportunities for independent living in their homes. Special attention will be given to the impaired, socially isolated, very old, minority and low-income individuals who are at special risk of mental and physical illness.

Many areas of the country remain critically underserved by the PHS and other Federal (or indeed any) programs. Humane care for the elderly, healthy and ill, remains one of this country's major unmet needs, especially those services which can intervene and prevent deterioration of function and competence.

D. DATA COLLECTION FOR PREVENTION

Effective efforts in health promotion, health protection, or the delivery of personal preventive health services, require the existence of sound data systems both in the development of program targets and in program monitoring. There are currently two basic types of ongoing HEW data systems from which a prevention data base could be developed: general purpose statistics, acquired primarily by the various data systems maintained by the National Center for Health Statistics (NCHS); and program data sets, maintained by each of the PHS agencies. (The latter are supplemented by program data sets in HCFA, HDS, OE, as well as in such agencies as the Environmental Protection Agency, Consumer Product Safety Commission, and others.)

The NCHS has a number of systems which provide data regarding prevention. To date, the principal sources have been the Health and Nutrition Examination Survey (HANES) and the Health Interview Survey (HIS). Following this section is a summary which identifies specific prevention and related data collected in recent surveys.

The HIS is an annual nationwide sample survey in which data are collected by the U.S. Bureau of the Census through personal household interviews. Information is obtained on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other health topics. For most topics, data are collected over an entire calendar year. The universe for HIS is the civilian noninstitutionalized population of the United States. Members of the Armed Forces and U.S. nationals living in foreign countries are excluded. The usual HIS sample is about 116,000 persons in 40,000 interviewed households in a year. The response rate is ordinarily about 96 percent of the eligible households.

The HANES collects needed health-related data which can be obtained only by direct physical examinations, clinical and laboratory tests, and related measurement procedures. The HANES target population is the civilian noninstitutionalized population aged 1–74 residing in the coterminous United States, except for people residing on any of the reservation lands set aside for the use of American Indians. Data are collected in two mobile examination centers (MEC's) by specially trained teams of examination staff. Health examination representatives complete medical histories in households and arrange appointments for sample persons to be examined at MEC's. Household interviews were completed for over 96 percent of the 28,043 persons selected for the HANES I sample, and about 75 percent (20,749) were examined between 1971 and 1974.

Other NCHS data bases useful to prevention are derived from the National Ambulatory Medical Care Survey, the Hospital Discharge Survey, and the Vital Registration System. The latter is a particularly important tool. The vital registration system of the NCHS collects and publishes data on births and deaths in the United States. The Division of Vital Statistics obtains information from the registration offices of all States, certain cities that perform their own data collection, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. The standard certificates of birth, death, and fetal death recommended by NCHS are modified in each registration area to serve the area's needs. However, most certificates conform closely in content and arrangement to the standard certificate, and all certificates contain a minimum data set required by NCHS.

It is a fact, however, that the NCHS data systems are by design multipurpose and are not devoted singularly or even substantially to the issue of prevention. There is therefore an opportunity to deploy the capabilities of the NCHS to a comprehensive assessment of the country's involvement in prevention. This will require a commitment, translated into data priorities and additional resources. Consideration ought to be given to substantial budgetary increases for NCHS to modify its questionnaire instruments to collect ongoing prevention data and to analyze rapidly and disseminate those data.

Program data sets are varied and in some ways rich and useful data. These range from ongoing systems, such as CDC's morbidity reporting, HSA's common reporting system for grantees, FDA's food and drug monitoring systems, etc., to periodic surveys of trends, such as ADAMHA's alcohol and drug use surveys, CDC's smoking surveys, etc. The NCI's preparation of a cancer distribution "Atlas" has also provided valuable insights for prevention. While these are not now all assembled under one "system," their data are used internally by the responsible agency and widely diffused to other users. Recently, vehicles such as *Health, United States 1976–1977* have brought together summary data from many sources, many of which has bearing on prevention programs. As part of HEW's commitment to greater emphasis on prevention, budget increases are needed to extend nationwide the nutrition surveillance systems in participating States. A chapter in *Health, United States* devoted to the issue of prevention could be used to monitor progress through data collection systems.

In addition to data already collected and analyzed, additional attention should be given by each agency to data now available, but not fully analyzed. Each agency head should review the output of current prevention data systems, and commit statistical, analytical, and data processing resources adequate to fill gaps in data which can be met from existing data sources. Linkage with related systems in Agriculture's data resources related to food and nutrition, the Environmental Protection Agency's air and water monitoring systems, and the Department of Labor's information banks on employee health and safety, are all obviously important to HEW's work.

We have an obligation to minimize the reporting burden on the public, and should carefully assess the value of new data before we collect it. By the same token, the priority on enhancing prevention should not be thwarted by inadequate data to tell what we are doing or where we are going.

One may draw an analogy with the highly successful smallpox eradication campaign in India, in which not one, but several, management information and surveillance systems were used. The comparability of these reports provided confirmation and confidence that specific areas had become smallpox free and others were hot spots to which resources could be shifted. An analogy in the United States might be smoking. The NCHS Health Interview Survey will be able to provide at regular intervals a broad indication of status and trends of smoking habits. The periodic CDC surveys of teenage and adult smoking habits provide a detailed view of the profile of smoking in these groups, and, by comparison with earlier surveys, considerable richness of trend data. These two systems complement and confirm our knowledge in a vital area of prevention.

Listed below are specific sources of national data about prevention activities from the National Center for Health Statistics:

1. National Ambulatory Medical Care Survey 1972

Reason for visit:
  Pre- and post-natal care
  Well adult/child examination
  Family planning
  Counseling and advice
  Immunization
  By sex, age, color, kind of doctor
Special survey 1971–72:
  Physical fitness

2. Health Interview Survey 1973

Trimester of first prenatal examination
Number of doctor visits for "general checkup" (continuing item, all years)
EKG, interval since last
Glaucoma test, interval since last

    - Chest X-ray, interval since last
    - Eye exam, interval since last
    - Pap smear, interval since last
    - Breast exam, interval since last
- Under 17 years:
    - Routine physical exam, interval since last
    - Age at first dental visit

Health Interview Survey 1974

- Health habits:
    - Cigarette smoking, smoking control
    - Blood pressure reading, interval since last
    - EKG reading, interval since last
    - Chest X-ray reading, interval since last
    - Height-weight; weight perception, weight control

Health Interview Survey 1975

- Health habits:
    - Exercise, sports and physical activity

Health Interview Survey 1976

- Health habits:
    - Sleeping pills
    - Aspirin use
    - Coffee drinking
    - Tea drinking
    - Cigarette smoking

Health Interview Survey 1977 (Available Fall 1978)

- Health habits: (Belloc-Breslow)
    - Hours of sleep
    - Frequency of breakfast
    - Eating between meals
    - Physical activity
    - Alcohol consumption
    - Cigarette smoking
    - Height-weight

Health Interview Survey (All Years)

- Selected preventable conditions:
    - Medically attended
    - Hospitalized
    - Impact

3. Health and Nutrition Examination Survey I 1971–74

Persons who have not talked to a doctor ever
Persons who have not talked to a doctor in past 4 years
Persons who have not talked to a doctor in past year

Immunization, ages 1–5:
- DPT
- Polio
- Smallpox
- Measles
- German measles
- Mumps

Persons who have never had:
- a "general checkup"
- a cardiogram
- blood pressure check
- a chest X-ray
- blood tests

Persons who have never had:
- a urinalysis
- vision tests
- hearing tests
- a rectal exam
- any preventive immunizations

Persons who have never visited a dentist
Persons who have not visited a dentist in 4 years
Persons who have not visited a dentist in past year
Females who have never had an internal exam
Smoking behavior
Drinking behavior
Exercise behavior; physical activity
Quality of drinking water, and water drinking behavior

Health and Nutrition Examination Survey II 1976–79

Smoking behavior
Coffee drinking
Tea drinking
Use of aspirin
Exercise and physical activity
Weight history
Diet, special

4. Hospital Discharge Survey

5. Division of Vital Statistics

Preventable diseases causing death

V. FEDERAL PREVENTION ACTIVITIES OUTSIDE HEW

Much of the Federal Government's work in health protection, health promotion and the delivery of personal preventive health services is undertaken outside the Department of Health, Education, and Welfare. This chapter summarizes a larger report prepared for the Task Force and reproduced in the appendixes.

A host of Federal agencies outside of the Department of Health, Education, and Welfare (HEW) have responsibilities or functions related to prevention. An inventory of Federal activities in this area shows that 10 departments, 17 independent agencies, 3 quasi-official agencies, 5 permanent or temporary offices or commissions within the Executive Office of the President, and 4 agencies within the Legislative Branch potentially play some role with respect to prevention.[1]

The purpose of this inventory of Federal activities outside of HEW is to identify major programs in the area of prevention and to define major fields of activity that lie outside of the jurisdiction of HEW, as well as areas in which departmental and agency jurisdictions overlap. In attempting to describe accurately and realistically the scope of Federal activities in prevention, several different types of information have been reviewed: budgetary analyses by the Office of Management and Budget and other analysts; descriptions of the purpose, organization, and administration of major activities within Federal departments and agencies; a summary of major pieces of health-related legislation enacted during the past 40 years; and detailed program descriptions contained in available annual reports and in policy and planning documents.

Careful review of these various sources of information had led to one conclusion: there is no good guide to the scope of Federal activities in prevention.

Lack of agreement about a definition of prevention makes an accurate and complete inventory of Federal programs outside of HEW a nearly impossible task, especially from a budgetary viewpoint. In many cases, health-related or prevention-related expenditures are subsumed under those for other functions (e.g., national defense, income security, or natural resources and environment). In most cases, the health-related or prevention-related activities of a particular department are reported as part of other program costs and are not separated out as line items. The most serious difficulty in assessing the scope of preventive activities is in discerning which "health service" programs feature preventive services. There is presently no way to disentangle outlays for preventive services from those for treatment services. Clearly many "health service" programs provide little in the way of prevention. However, it would seem a necessary step in policy formation as well as in the apportionment of appropriations to know exactly how much, or how little, is spent on preventive health services by large Federal providers, such as the Department of Defense (DoD), and the Veterans' Administration (VA). In fact, until realistic dollar figures can be attached to accurate descriptions of all departmental and agency activities in the area of prevention, little more than broad brush strokes can be used in drawing a picture of Federal activities in prevention.

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[1] A summary list is found at the end of this chapter. This count does not include Congressional Committees and Subcommittees with jurisdictions in health- or prevention-related areas.

The following inventory of Federal activities related to prevention outside of HEW has been limited essentially to programs and activities in areas traditionally regarded as preventive in nature:

- health education and information
- preventive health services
- health-related research
- nutrition—provision of food (direct and indirect), nutrition education, nutrition research, surveillance of food consumption
- environmental protection—air, water, and noise pollution; solid waste/nuclear waste disposal; pesticides; toxic substances; radiation; nonnuclear energy and mineral production and the environment
- occupational health and safety
- transportation safety—aviation, marine, highway and traffic, motor vehicle, motor carrier, railroad, and hazardous material transport
- home safety codes and standards
- recreational safety
- consumer product quality and safety—food, drugs, cosmetics, medical devices; other consumer products (household products and appliances, tools, toys, etc.); alcohol; tobacco; firearms; and motor vehicles
- fire prevention

Some mention has also been made of recreational and outdoor facilities under the purview of the Department of Agriculture (USDA) and the Department of the Interior (DoI). A detailed inventory of these facilities would be useful to the President's Council on Physical Fitness and Sports (PCPFS) with regard to the cooperative development of fitness trails and parcourses.

In reviewing Federal activities in nutrition, environmental protection, occupational health and safety, consumer and product safety, and transportation safety, an attempt was made when possible to catalog the use of the major tools in prevention identified as strategy elements by the Prevention Task Force: public information and education, economic incentives, regulation, capacity building outside of the Federal Government, services (direct and indirect), manpower education and training, and research, including statistical and epidemiological support.

Clearly, regulation has become a dominant (and perhaps the most unwieldy) tool in the area of prevention. The enforcement and compliance function of regulation is entirely out of the hands of HEW in three major areas—the general environment, the workplace, and transportation safety. The tool is shared with the Department of Agriculture, the Federal Trade Commission, and the Consumer Product Safety Commission in another major area—consumer product quality and safety.

The areas with particular weaknesses with respect to the potential use of these strategies in prevention are nutrition, environmental protection, and occupational health and safety.

Nutrition activities are deficient in many areas—public information and education, services (nutrition counseling), regulation (food safety and quality), manpower education and training, human nutrition research, and statistical and epidemiologic support. Since nutrition is an area in which HEW shares the purview, it seems logical that the Department try to fill some of the obvious gaps.

In the areas of environmental protection and occupational health and safety, the issues are less clear cut, but they center on the need for incentives, manpower education and training, capacity building outside of the Federal Government, research, and statistical and epidemiologic support. Only some of these issues can be addressed by HEW.

Potentially there are various roles for HEW to play with respect to the wide array of Federal activities in prevention that lie largely outside of the Department. The first role is to undertake a systematic analysis of the gaps in prevention—the inadequate or unsuccessful application of the major tools of prevention—both inside and outside of HEW in such major areas as nutrition, environmental protection, occupational health and safety, transportation safety, consumer product safety, home and recreational safety, and fire prevention.

A second step in this analysis would be to evaluate which tools might be more effectively developed and applied by HEW than by other departments or agencies involved. A third step would be to decide which tools might be developed in cooperation with the major departments and agencies discharging responsibilities in the area of prevention.

One of the chief problems in the area of prevention is that prevention appears to be almost everyone's business, but nobody is minding the store. This circumstance sets the stage for a second major role for HEW—the role of advocate. As it stands, there are nuclei of prevention-related activities in almost every department and in many independent agencies. Legislative mandates and department and agency lines of authority dictate, at least for the present, that these prevention activities will remain for the most part encapsulated. These activities will grow only in response to strong advocacy for prevention both inside and outside of these agencies, the Executive Branch, and the government in general.

The time may well have arrived for HEW to consider introducing the idea of a permanent Interagency Council or Committee on Prevention. No other agency has the lead role in health, so the initiative is not likely to be taken by any other department or agency. As a first step in this direction, a detailed analysis of preventive activities might be undertaken on a governmentwide basis. Until there is some better idea how the prevention dollar is being divided up and to what overall effect, policy development will be badly hampered.

This inventory of Federal prevention-related activities outside HEW is, hopefully, a small beginning. It is descriptive, however, rather than evaluative in nature. It speaks in terms of legislative authorities, responsibilities, and functions, not in terms of the cost or the degree of effectiveness of these activities.

A. DEPARTMENTS

1. Department of Agriculture (USDA)

The prevention-related programs administered by the USDA are perhaps more wide reaching than those of any department other than HEW. The range includes food and nutrition programs directed to needy infants, children, pregnant women, mothers, elderly persons, and other low-income persons; nutrition education programs; nutrition research; food quality and safety programs; pollution control and abatement; and other environmental protection programs.

Reorganization of USDA in 1977 has resulted in both administrative and operational changes. One of the most significant of these changes is the planned creation of a Science and Education Administration which will include a Human Nutrition Center. A Joint Committee on Food and Agricultural Sciences has been convened.

The major prevention-related programs within the USDA are administered by the following agencies: Agricultural Research Service; Animal and Plant Health Inspection Services; Cooperative State Research Service; Economics, Statistics, and Cooperative Service; Extension Service; Farmers Home Administration; Food and Nutrition Service; Food Safety and Quality Service; and the Forest Service.

a. Agricultural Research Service (ARS)

ARS, one of the four principal research agencies within USDA,[2] conducts a major portion of the Department's basic and applied research directed toward providing a safer, more economical, and more abundant food supply.

Two of ARS's five major areas of research (food processing, storage, distribution, and safety; and consumer service research and human nutrition research) are directly health or prevention related. The other three areas (animal and plant production research; and soil, air, and water research) include prevention-related activities.

b. Animal and Plant Health Inspection Service (APHIS)

APHIS is responsible for the prevention, control, and eradication of pests and plant and animal diseases. To perform these functions, the service is authorized to carry out inspection, quarantine, and regulatory activities at U.S. ports of entry and within the States.

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[2] Almost all of the research carried out by the USDA is conducted or administered by the Agricultural Research Service, the Cooperative State Research Service, the Forest Service, and the Economics, Statistics, and Cooperative Service.

c. Cooperative State Research Service (CSRS)

CSRS administers Federal grant funds to State agricultural experiment stations as well as to other public and private organizations in support of research in agricultural practices, crop productivity, forestry, rural development, and human nutrition.

The most important of these areas in relation to prevention are:

- *human nutrition research*—funds in this area in the amount of $5 million were administered by the ARS in 1978. In 1979, these funds will be administered by CSRS and will be increased to $11 million in competitive grants emphasizing human requirements for nutrients, nutrient composition of foods, and the effects of agricultural practices on processing, handling, and cooking;
- *pest management, pesticide clearance, pesticide impact assessment*—special research grants will be funded in these areas in 1979.

d. Economics, Statistics, and Cooperatives Service (ESCS)

ESCS was established in 1977 by consolidating the Economic Research Service, Statistical Reporting Service, Farmer Cooperative Service, and the Economic Management Support Center. Health- or prevention-related activities of ESCS deal with:

- *the health of rural Americans,* including analyses of health services, distribution of and utilization of hospital services, and the problems of rural poverty and health; and
- *economic feasibility studies of biological pest control and pest management studies.*

e. Extension Service (ES)

ES is the chief educational arm of the USDA. The primary function of this nationwide system of cooperative extension work is out-of-school applied education in agriculture and natural resources, home economics, 4–H youth programs, and community resource development.

Health-related programs, which are carried out under all four categories, include the following:

- farm safety educational programs for farm families and employees;
- education in nutrition, including meal planning, food selection, buying, preparation, home production, preservation, storage, safety, sanitation, and efforts to improve the dietary level of low-income families and youth through education and improved use of research;
- education programs on prevention of illness, use of available health services and facilities, identification of needs for additional health facilities and services, and to help reduce injuries and

fatalities in the home, on the farm, and on rural roads and highways; and, programs to improve such community services as housing and access to services and facilities, especially waste water disposal, emergency medical services, health education, and recreation.

f. Farmers Home Administration (FmHA)

FmHA provides grants and loans to individuals, families, and communities for rural development, rural housing, resource conservation and development as well as other purposes. Among the grant programs that might be described as preventive in nature are:

- *rural water and waste disposal grants;*
- *very low-income housing repair grants and loans* to make essential, minor repairs to correct health or safety hazards.

g. Food and Nutrition Service (FNS)

Established in 1969 to administer food assistance programs to the needy in cooperation with State and local governments, FNS currently administer the following programs:

- Food Stamp Program—operating through State and local welfare agencies, this program helps to increase the food purchasing power to eligible households by enabling them to purchase food at regular retail stores with food stamp coupons. The program serves elderly people living on Social Security or other pensions; the unemployed; some welfare recipients; some part-time workers; some workers with low wages; and people with no income at all. Under the Meals-on-Wheels program, food stamp recipients aged 60 or over, who are physically handicapped, feeble, or unable to prepare meals may use food coupons to have meals delivered to the home.
- Child Nutrition Programs—several programs are designed to improve the nutritional status of children, particularly those from low-income families. These programs serve eligible children of high school age and under in public and nonprofit private schools, child care centers and settlement houses, summer camps, recreation centers, and other eligible institutions. To administer the programs, FNS works directly with State education agencies and enters into agreements with schools, institutions, or civic groups for the operation of these programs, which include: National School Lunch Program; School Breakfast Program; Special Milk Program; Child Care Food Program; Summer Food Service Program for Children; Nonfood Assistance Program; Food Distribution Program; and other nutrition studies and education.
- Special Supplemental Food Program for Women, Infants and Children (WIC)—This program provides specified nutritious food supplements to pregnant and nursing women for a period up to 6 months postpartum and to children up until their fifth birthday who are determined by competent professionals (physicians, nutritionists, nurses, and other health officials) to be at "nutri-

tional risk" because of inadequate nutrition and inadequate income.

h. Food Safety and Quality Service (FSQS)

The FSQS was established in 1977, to coordinate activities designed to insure that the public receives foods that are safe, wholesome, nutritious, and appropriately labeled. FSQS inspects, certifies, standardizes, and grades certain commodities (dairy products, fruits, vegetables, meat, poultry, and eggs and egg products). FSQS also assists the consumer in differentiating between products by applying nationally uniform standards of quality in grading agricultural products. In addition, the service purchases surplus commodities for use in domestic food and nutrition programs.

i. Forest Service (FS)

FS research and other programs that might be categorized as preventive include: research to develop measures for the protection of forests from damage by fire, insects, and diseases; forest fire prevention and control; pollution abatement; and promotion of the wise use of the environment.

2. Department of Commerce (DoC)

Major prevention-related activities in the Department of Commerce focus on the monitoring, prediction, control, and abatement of marine and atmospheric pollution and are carried out principally by the National Oceanic and Atmospheric Administration and the Maritime Administration. Other pollution abatement and control programs include the provision of grants and loans for the construction of water and waste treatment facilities and water and sewer lines where these items are needed to foster economic development. These economically oriented programs will account for an estimated $200 million in outlays in 1979, chiefly by the Department's Economic Development Administration and Regional Action Planning Commissions. Other more traditional preventive services are administered by the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, which conducts some consumer protection programs, and the National Fire Prevention and Control Administration.

a. Maritime Administration (MarAd)

Preventive activities focus on the marine environment and its pollution, including: environmental impact of the nuclear merchant ship program; enforcement of ship construction standards which incorporate pollution abatement features; production of a manual for fuel, cargo, and waste disposal systems onboard tankers; and research and development projects to evaluate the effectiveness of various equipment and modes of operation, development of design concepts that incorporate safety and pollution abatement features, and development and testing of marine sewage treatment systems.

b. National Oceanic and Atmospheric Administration (NOAA)

Established in 1970 to expand effective and rational use of ocean resources, to monitor and predict conditions in the atmosphere, ocean, and space, and to explore the feasibility and consequences of environmental modification, NOAA is the largest operating agency in the DoC, with 40 percent of the Department's personnel (more than 12,000 employees), and one-fourth of the Department's total appropriation.

NOAA's environmental monitoring and prediction activities include the following health-related efforts:

- research on atmospheric diffusion, transport, and removal of environmental pollutants;
- analysis and monitoring of man's impact on marine ecosystems, including such problems as ocean dumping and its effect on the environment, marine life, and public health; oil transport and waste disposal; the environmental impact of new forms of resource development; and operation of the National Environmental Satellite Service, which provides data on air and water pollution;
- study of the effects of long-term changes in the physical world on global food production, energy use, and resource management;
- operation of national weather forecast services, which provide pollution-potential forecasts to officials in cities with air pollution problems; and
- development of improved technology for all types of forecasting of atmospheric and oceanic processes, including technology needed for proper solution of air pollution problems and an understanding of the effects of human intervention on the earth and water.

NOAA is also involved in consumer protection activities through the fisheries products inspection and certification program of the National Marine Fisheries Service.

c. National Fire Prevention and Control Administration (NFPCA)

NFPCA focuses on assisting, supplementing, and expanding the Nation's fire prevention and control efforts. The Administration has no regulatory, standard-setting, or enforcement responsibilities, but functions primarily as a catalyst and coordinator of education, data, and research programs that interface with those of other Federal agencies and State and local governments.

3. Department of Defense (DoD)

a. Health Care Services

DoD operates an extensive health care system in support of active duty service personnel, service dependents, retired service personnel, and civilian employees, including: hospitals and related facilities for medical and dental care; outpatient care facilities; occupational health clinics; preventive medicine programs; health professional education and training programs; and medical research and development facilities and programs.

The Office of the Assistant Secretary of Defense for Health Affairs is responsible for the overall planning and administration of the Department's health and sanitation activities, including: care and treatment of patients; preventive medicine; clinical investigations; hospitals and related facilities; nutrition programs; drug and alcohol abuse programs; and health personnel, procurement, education and training.

The Departments of the Army, Air Force, Navy and U.S. Marine Corps, each headed by a Surgeon General, administer programs to provide health services to their respective personnel.

No detailed description of preventive health services, substance abuse prevention programs, occupational health programs, or nutrition programs was available at the time this summary was prepared.

b. Environmental Protection Activities

DoD programs will account for $348 million, or 73 percent of the total outlays for pollution abatement from Federal facilities estimated for 1979. This amount includes noise and air pollution control of Air Force aircraft, control of pollution at Army ammunition plants and bases, and improvement of Navy Sewage Systems. The Navy also operates the Environmental Protection Program, a worldwide pollution abatement program for ships, shore facilities, and air operations.

The Corps of Engineers programs to improve and expand knowledge relating to water quality and management include assessment of the environmental impact of pollutants on man, fish, wildlife, and aquatic systems and deals with such problems as the governing of discharge of dredged or fill materials into navigable waters. The Corps also develops recreation facilities at water resource projects and ensures measures essential to the health and safety of the public using these facilities.

4. Department of Energy (DoE)

DoE was established in 1977 to consolidate the activities of the Federal Power Commission, Federal Energy Administration, Energy Research and Development Administration, and several regional power administrations. Health or prevention-related activities of DoE include:

- research aimed at the biological mechanisms involved in pollutant damage and repair, and at new information on novel uses of radiation, radioactive and high-priority stable isotopes for diagnosis and treatment of human diseases; and
- a research program designed to assure the environmental, health, and safety acceptability of energy technologies being developed.

Both DoE and the Environmental Protection Agency conduct environmental research to determine the consequences of the byproducts of energy production and use on human health and the environment. The results of this research are used to set pollution standards and regulations, as well as to determine priorities for research in fossil, fission, and other energy technologies.

5. Department of Housing and Urban Development (HUD)

HUD's prevention-related activities include:

- community development block grant programs for property acquisition, construction of public facilities, rehabilitation of buildings, provision of social services, including activities to protect and improve the environment;
- environmental planning activities in response to the mandate of the National Environmental Policy Act of 1969. These activities include the development and implementation of environmental assessment criteria, of building code modernization and amelioration, and of strategies for the solution of environmental problems such as natural hazards, air and noise pollution. HUD has lead responsibility for working with national technical and professional organizations to improve State and local code administration;
- mobile home standards program to enforce construction and safety standards;
- Annual Housing Survey to measure changes in housing inventory and to compile data on the physical conditions of housing units and the occupants in both urban and rural areas.

6. Department of the Interior (DoI)

The Department of the Interior is the Nation's principal conservation agency and several of its bureaus and services are engaged in activities that might be described as preventive in nature. Among them are the following:

a. Bureau of Land Management (BLM)

BLM is responsible for the conservation, management, and development of 470 million acres of national resource lands, the administration of mining and mineral leasing on 370 million acres, as well as the energy and minerals management of the 1.1 billion acres of the Outer Continental Shelf. BLM's prevention-related activities deal with: the environmental impact of proposed energy and minerals development; soil stabilization; improvement of water and air quality; fire prevention and suppression; and, recreational facilities for camping, picknicking, and other outdoor recreation use.

b. Bureau of Mines (BoM)

Principally a research and factfinding agency, BoM's prevention-related activities include: research to minimize environmental impacts of mineral processing; research toward effecting pollution abatement; efforts to develop solutions to safety and engineering-related health problems imposing a major social cost on mining operations; study of a broad range of safety and health problems in coal, metal, and nonmetal mines, including respirable dust, fire and explosion prevention, industrial hygiene, radiation hazards, ventilation, noise, and system engineering; and, research to eliminate adverse environmental effects associated with the extraction of minerals, metals, and fuels essential to economy.

c. Bureau of Heritage, Conservative, and Outdoor Recreation (BHCOR)

BHCOR promotes the coordination of outdoor recreation programs, and administers the land and water conservation fund that provides grants for planning, acquisition, and development of State and local recreation areas. The fund also provides for Federal purchase of important recreation and conservation land.

d. Geological Survey (GS)

GS collects, analyzes, and publishes information about mineral, water, and land resources. Although the agency conducts no environmental protection programs, it will spend $20 million in 1979 for various studies, including water resources research to determine the sources and effects of pollution, and to study the disposal of high-level nuclear waste.

e. National Mine Health and Safety Academy (NMHSA)

The Academy, under the provisions of the Federal Mine Safety and Health Act of 1977, is responsible for training mine safety and health inspectors, and training technical support personnel of the Mine Safety and Health Administration, Department of Labor.

f. Bureau of Indian Affairs (BIA)

BIA provides preventive services through programs in Indian schools and environmental controls on reservations.

g. National Park Service (NPS)

NPS develops, operates, and maintains the National Park System, comprising about 31 million acres. Its major preventive activities are: forest fire suppression and prevention of environmental damage and accidents.

h. Office of Surface Mining Reclamation and Enforcement (OSMRE)

This new regulatory office, established in 1977, has two major goals: to prevent the permanent degradation of land due to surface mining of coal; and to reclaim land previously damaged by such mining.

i. United States Fish and Wildlife Service (FWS)

The FWS' prevention-related activities are in the area of environmental protection and pollution surveillance and evaluation of projects and actions that may affect the Nation's fish and wildlife resources. The Service also conducts surveillance and monitoring of pesticides, heavy metals, and thermal pollution to help evaluate and control environmental contamination of fish and wildlife. An increased role by the Service in environmental contaminant evaluations of fish and wildlife resources is anticipated, and a new thrust will be in the area of anticipating, predicting, and monitoring crises.

7. Department of Justice (DoJ)

Several divisions within the DoJ—the Antitrust Division, the Criminal Division, and the Land and Resources Division—play a role in enforcing Federal laws designed to protect the environment and the consumer and in reviewing the orders of Federal regulatory agencies. Other Justice agencies, such as the Drug Enforcement Administration and the Law Enforcement Assistance Administration, have separate purviews that have implications in the area of prevention.

a. Antitrust Division

The Consumer Affairs Section of the Antitrust Division is responsible for instituting civil and criminal proceedings in cases referred to the DoJ by other agencies, such as the Food and Drug Administration and the Federal Trade Commission, which have major responsibilities for consumer protection activities.

b. Criminal Division

The Criminal Division's responsibilities include enforcement of such criminal laws as illegal trafficking in narcotics and other controlled substances, illegal transportation of firearms, and criminal statutes relating to employer-employee relationships.

c. Land and Natural Resources Division

This Division represents the United States, its agencies, and officials in civil lawsuits relating to the acquisition, management, control, protection, use, and disposition of land and natural resources. It is also responsible for criminal prosecutions for air, water, and noise pollution as well as criminal actions involving navigable waters.

d. Drug Enforcement Administration (DEA)

Established in 1973, DEA's mission is to provide a leadership role in narcotic and dangerous drug suppression programs at a national and international level. As the lead agency in Federal drug law enforcement, DEA is responsible for developing the overall Federal drug enforcement strategy as well as for continuously assessing the effectiveness and applicability of programs.

DEA activities include: studies comparing the deterrent effects of various enforcement strategies; studies assessing and detecting accurately the presence of controlled substances in the body; and studies evaluating the nature and sources of supply of dangerous substances.

e. Law Enforcement Assistance Administration (LEAA)

The Omnibus Crime Control and Safe Streets Act of 1968 as well as the Juvenile Justice and Delinquency Prevention Act of 1974 and amendments to these acts place within LEAA responsibility for providing assistance to States and localities in reducing crime and juvenile delinquency and in strengthening the quality of the justice system.

8. Department of Labor (DoL)

The Occupational Safety and Health Act of 1970 and the Federal Mine Safety and Health Act of 1977, placed within DoL the two chief standard-setting and enforcement agencies in the area of occupational health and safety: the Occupational Safety and Health Administration, and the Mine Safety and Health Administration.

a. Mine Safety and Health Administration (MSHA)

Health and prevention-related activities of this new administration include: development, promulgation and enforcement of health and safety standards, assistance in mine rescue operations, investigations of serious accidents in mines, and recommendations to reduce working hazards; education and training to make the miner a safe worker; and technical support for field managers, mine inspectors, State program employees, and industry management.

b. Occupational Safety and Health Administration (OSHA)

OSHA is responsible for the following activities: establishment and enforcement of mandatory standards for working conditions, tools, equipment, facilities, and processes. Enforcement of standards is accomplished through physical inspection of plants and facilities to assure compliance with Federal standards, and abatement of occupational health and safety problems. Standards are based on research and recommendations of the National Institute of Occupational Safety and Health (NIOSH) of HEW, as well as special advisory committees and other Federal and State agencies.

Inspections are targeted to fatal and catastrophic accidents, claims of imminent danger, employee complaints, and higher risk industries. OSHA also provides training programs and educational materials to employees to help them understand their rights and responsibilities under the Occupational Health and Safety Act, as well as ways to assure safe and healthful workplaces.

In addition, statistics on occupational fatalities, injuries, and illnesses are collected and published annually to aid in identifying occupational safety and health problems and to improve the program. Employers with 11 or more employees are required to maintain a record of work-related fatalities, illnesses, and injuries for examination by Federal and State enforcement personnel.

9. Department of Transportation (DoT)

DoT plays a lead role in transportation safety and a major role in the environmental impact of transportation. Prevention-related programs are conducted within a number of DoT agencies, including the following:

a. Coast Guard

Prevention-related activities of the Coast Guard are essentially in two areas: marine environmental protection and boating safety.

The marine environmental protection program includes: prevention and enforcement activities to improve capability for detecting violations of pollution laws; the spill response program to minimize effects of oil and hazardous substance spills; and, an abatement program that aims to reduce or eliminate water polution.

The boating safety program encompasses the regulation and enforcement of Federal boating laws, search and rescue activities, and financial assistance to States in the development of comprehensive boating safety programs.

b. Federal Aviation Administration (FAA)

FAA's prevention-related activities deal with the safety of civilian aircraft, personnel, passengers, and freight, and research on aviation safety and pollution control.

Regulatory programs include: the national air traffic system; a flight standards program to promote safety of flight in civilian aircraft; medical programs to deal with physical examinations of applicants for new or periodic renewal of medical certification; training of private physicians in the special requirements of aviation medicine; development and supervision of an occupational health program for agency personnel; and the conduct of medical education activities for airmen.

In addition to air and noise pollution research, FAA also conducts research in aviation medicine aimed at reducing the probability of accidents by identifying and eliminating physical, physiological, and psychological factors that may jeopardize flight safety.

c. Federal Highway Administration (FHYA)

This agency is responsible for such prevention-related activities as highway safety and motor carrier safety.

FHYA also conducts research and development projects on highway safety, problems of traffic congestion, improvements in traffic and pedestrian safety, methods of controlling noise, vibration, and pollution, and methods to provide increased safety by improving highway design.

Through its National Highway Institute, FHYA offers a fellowship program in highway safety, transportation research and education.

In addition, as the provider of financial assistance to States for highway construction, the FHYA can promote the use of portions of the funds for construction of fitness trails.

d. Federal Railroad Administration (FRA)

The prevention-related activities of this agency include the administration and enforcements of railroad safety laws and regulations and research in railroad safety.

e. National Highway Traffic Safety Administration (NHTSA)

NHTSA administers a number of prevention-related activities, including: the motor vehicle standards program; the motor vehicle consumer information program; and traffic safety programs.

NHTSA also funds programs to control the drinking driver, increase the intensity of traffic law enforcement, improve the quality and availability of emergency medical services, and improve program management.

Research activities cover a wide range of subjects, from alcohol and drug and their effect on driving, to tire safety and effectiveness.

f. Research and Special Programs Directorate

This organization, established in 1977, includes the activities of the former Materials Transportation Bureau and selected line functions formerly in the Office of the Secretary of DoT. Its mission is to ensure the safe transportation of dangerous or hazardous cargoes in commerce and to carry out research, development, and training activities.

g. Transportation Systems Center (TSC)

TSC serves as the research, analysis, and development resource for the Office of the Secretary of DoT. Prevention related activities include rail and motor safety research; technological support in airport surface traffic control, wind shear, crash protection, and human factors; environmental pollution assessment; aircraft, truck, and railroad emissions modeling and measures; and ship oil spill prevention technologies.

h. Urban Mass Transportation Administration (UMTA)

Two of this administration's programs are related to prevention: research and development of air pollution control devices for buses; and development of a new generation of mass transit buses containing new features and improvements intended to make buses easier to use by elderly and handicapped individuals.

10. Department of the Treasury

Two law enforcement agencies of the Department of the Treasury—the Bureau of Alcohol, Tobacco and Firearms and the United States Customs Service—perform functions with preventive implications.

a. Bureau of Alcohol, Tobacco and Firearms (BATF)

The Bureau regulates the alcohol and tobacco industries, the legal firearms industry, and the explosives industry, and enforces laws designed to eliminate illegal possession, use, and trafficking of firearms, destructive devices, and explosives and to suppress traffic in distilled spirits.

b. United States Customs Service

Customs Service activities that might be described as preventive in nature are:

- *narcotics tactical interdiction program*—in conjunction with the

Drug Enforcement Administration and in cooperation with foreign governments;

- *environmental and consumer protection programs*—enforces prohibition on discharge of refuse and oil into or upon coastal navigable waters of U.S. for Coast Guard; enforces safety and emission standards required for imported vehicles and equipment; enforces laws and regulations regarding animals and birds injurious to community health, plant, and animal life, as well as other agriculture and plant quarantine regulations regarding animal, poultry, and animal byproducts.

B. INDEPENDENT AGENCIES

1. ACTION

ACTION, the Federal Government's agency for volunteers, has recently adopted a basic human needs planning and programming strategy that includes health and nutrition among the targets for such volunteer programs as VISTA, the Senior Companion Program, the Retired Senior Volunteer Program, and the Foster Grandparent Program.

2. Appalachian Regional Commission (ARC)

This commission is a Federal-State agency concerned with the economic, physical, and social development of the 13-State Appalachian Region, which includes parts of Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and all of West Virginia. One of the areas in which ARC invests is health and child development. ARC's original thrust in this area was directed at construction of health care facilities—hospitals, medical and dental clinics, ambulance and emergency medical services, and paramedical training—to create a system of facilities for the dissemination of health care services, which was nearly complete by the early 1970's. Other health and child development projects include:

- *multicounty health demonstration* areas to offer inhabitants health education, personal preventive service, diagnostic and therapeutic services, rehabilitative services, and communitywide environmental health services with stress on continuity and comprehensiveness of care;
- *primary care projects* (over 150) ranging from primary care clinics consisting of one nurse practitioner and an aide in isolated rural areas to a total outpatient program;
- *child development programs,* including screening, speech-hearing-vision services, prenatal and family planning services, day care, family counseling, services for the handicapped, and a nurse midwifery program.

ARC also funds sewer, water, and solid waste programs.

3. Community Services Administration (CSA)

The CSA, successor to the Office of Economic Opportunity, administers community action programs and community economic development programs designed to help low-income families and individuals. Health and prevention-related programs deal with such problems as housing, food and nutrition, medical care for the elderly poor, community food and nutrition services that supplement the USDA's larger programs, youth sports programs, and summer youth recreation for disadvantaged youth.

4. Consumer Product Safety Commission (CPSC)

The Consumer Product Safety Act of 1972 established the CPSC as a regulatory agency with the following purposes: (1) to protect the public against unreasonable risks of injury associated with consumer products; (2) to assist consumers in evaluating the comparative safety of consumer products; (3) to develop uniform safety standards for consumer products and to minimize conflicting State and local regulations; and (4) to promote research and investigation into the cause and prevention of product-related deaths, illnesses, and injuries.

CPSC has developed a set of programs designed to address such problems as: fire and thermal burn hazards; electric shock hazards; acute and chronic chemical and environmental hazards; and, mechanical hazards.

In addressing these product-specific problem areas, CPSC organizes its activities into the following major areas of initiative:

- *hazard identification*—collecting and sorting injury and hazard data through the National Electronic Injury Surveillance System (NEISS);
- *hazard strategy analysis*—analysis of data in an effort to develop options for remedial strategies;
- *regulatory development*—development of mandatory and voluntary standards to reduce risks of injury associated with consumer products;
- *information and education*—this activity seeks to reduce injuries by raising public awareness about product safety;
- *compliance and enforcement*—establishment inspections and related investigations are conducted to determine whether firms are in compliance with the law, and to obtain evidence to support legal action against violators.

5. Environmental Protection Agency (EPA)

EPA was established as an independent agency in 1970 through an executive reorganization plan designed to consolidate certain Federal environmental activities.

In addition to its basic activities in pollution abatement and control and enforcement of antipollution laws and regulations, EPA conducts research and development programs designed to provide a strong scientific basis for the development of standards and effective control strategies:

- to identify potential environmental problems before they arise;
- to determine the relationship of environmental pollutant exposure to carcinogenesis and chronic diseases;
- to develop exposure monitoring concepts and techniques; and
- to develop methods to serve as an early warning of the presence of new pollutants and to indicate trends related to the buildup of and degradation of present pollutants.

EPA's budget reflects these priorities by its major program areas: air quality; water quality (including safe drinking water); pesticides; radiation; solid waste; toxic substances; and noise.

6. Federal Maritime Commission

The Federal Maritime Commission regulates waterborne foreign and domestic offshore commerce of the United States. The Commission is responsible for insuring that vessel owners or operators establish that they are capable of assuming financial responsibility for water pollution.

7. Federal Mine Safety and Health Review Commission

This review commission adjudicates contested enforcement actions of the Secretary of Labor.

8. Federal Trade Commission (FTC)

The FTC performs several functions related to prevention, including:

- prevention of the dissemination of false or deceptive advertisements of consumer products;
- regulation of packaging and labeling of certain consumer commodities used in the home as well as certain foods, drugs, cosmetics, and devices: excluded are meat, poultry, and other products, subject to standards set by USDA; tobacco; alcohol; and certain drugs covered under the authority of FDA;
- regulation of cigarette advertising.

9. General Services Administration (GSA)

GSA operates the Consumer Information Center, which is responsible for encouraging Federal agencies to develop and release information of interest to consumers and for increasing public awareness of the availability of such information. The center publishes a quarterly catalog of selected Federal consumer publications on various topics, including: employment and education; health (general information, diseases and common ailments, medicine and drugs; food; diet and nutrition); and home energy conservation.

GSA's Office of Environmental Affairs has various types of information available to the public, including information on paper recycling, low-polluting vehicles, and other environmental activities.

10. National Aeronautics and Space Administration (NASA)

NASA research and development activities that have preventive implications include environmental quality monitoring and pollution abatement and control research.

In addition, NASA's life science research program is focused on the goal of insuring human health, safety, well-being, and effective performance in space; however, applications of this knowledge have been made and will continue to be made in medicine and biology.

11. National Science Foundation (NSF)

NSF supports long-term basic research in all fields of science, applied research on selected problems, and science and technology policy research. Research with preventive implications is carried out in the behavioral and social sciences. NSF also supports environmental research designed to enhance the Nation's capability to mitigate environmental hazards, whether natural or man made.

The foundation's policy research and analysis activities include analysis of emerging science and technology in such areas as health and safety, the environment, water supply, waste management, and analysis of environmental and health issues related to energy.

12. National Transportation Safety Board (NTSB)

NTSB's primary mission is to conduct independent accident investigations of all U.S. civil aviation, railroad, pipeline, highway, marine, and other transportation accidents that are catastrophic or involve problems of a recurring nature. The Board is responsible for determining the probable cause of the accident, and for reporting the facts, conditions, and circumstances of the accident. It also bears responsibility for making recommendations on safety measures and practices to prevent accidents.

13. Nuclear Regulatory Commission (NRC)

NRC was established as an independent regulatory agency under the provisions of the Energy Reorganization Act of 1974. Transferred to the agency were all licensing and regulatory functions formerly assigned to the Atomic Energy Commission. NRC's general purpose is to assure that civilian uses of nuclear materials and facilities are conducted in a manner consistent with the public health and safety, environmental quality, national security, and antitrust laws. The major share of the

Commission effort is focused on the use of nuclear energy to generate electric power.

14. Occupational Safety and Health Review Commission (OSHRC)

This commission, established in 1970 by the Occupational Safety and Health Act, is an adjudicatory body responsible for reviewing enforcement actions of the Occupational Health and Safety Administration, Department of Labor.

15. Small Business Administration (SBA)

SBA performs several functions related to the consumer protection, occupational health and safety, and environmental protection activities of other Federal health agencies. These functions fall into two categories: financial assistance to small businesses to assist them in complying with laws; and economic assessments of the impact of regulatory programs on small businesses.

16. Tennessee Valley Authority (TVA)

A Government-owned corporation, TVA was created in 1933 to conduct a program of unified development for a river basin comprising portions of seven States. The chief prevention-related activities of TVA are carried out by the Division of Environmental Planning and the Division of Medical Services:

- *Division of Environmental Planning*—includes programs in environmental quality, such as assisting local governments with solid waste collection and disposal problems, monitoring regional air quality, and improving the quality of streams and lakes; programs in occupational health and safety and field monitoring studies and investigations at TVA installations;
- *Division of Medical Services*—includes TVA's employee health programs; community health planning, education and demonstration products.

17. Veterans Administration (VA)

The VA operates the largest medical care delivery system in the country. In 1979 this system will comprise 172 hospitals, 16 domiciliaries, 92 nursing homes, and 228 outpatient clinics. The extent to which preventive health services are incorporated into this huge medical care delivery system has not, to the best of our knowledge, been documented. Materials available at the time this report was prepared did not allow for such documentation. Medical research, rehabilitative research, and health services research also are major components of the VA, as is education and training of health manpower. To what extent these activities support knowledge development and education in the area of preventive medicine is also, at this point, unknown.

C. QUASI-OFFICIAL AGENCIES

1. National Academy of Sciences (NAS)

The NAS serves in the capacity of an official adviser, upon request, to the Federal Government. No Federal funds are appropriated directly to the Academy; the principal funding mechanism being the negotiation of contracts with Federal agencies.

The NAS comprises the National Academy of Engineering, the Institute of Medicine (IOM), and its principal operating agency, the National Research Council (NRC). Both the NAS/NRC and the IOM support research and analysis related to prevention.

The most important activities of the NAS/NRC with respect to prevention are carried out in the following areas:

- *behavioral and social sciences*—research includes studies on child development, substance abuse, and habitual behavior;
- *life sciences*—research includes studies on safe drinking water and radiation effects. Most important is research and evaluation in the areas of food and nutrition and drugs;
- *natural resources*—includes research on radioactive waste management, energy and the environment, water pollution abatement, environmental monitoring; and,
- *sociotechnical systems*—fire research, and various environmental control technologies.

The IOM was chartered by the NAS in 1970 to deal with problems posed in the provision of adequate health services to all sectors of society. The Institute has conducted several studies with implications for the area of prevention and has recently issued a staff paper entitled, "Perspectives on Health Promotion and Disease Prevention in the United States," which explores Federal policy options in the area of prevention.

2. Smithsonian Institution

The Smithsonian Institution, an independent trust establishment, performs fundamental research, and publishes the results of studies, investigations, and explorations. In 1979 special research projects will be undertaken in these areas:

- *human nutrition;*
- *environmental preservation;*
- *disease prevention.*

3. The American National Red Cross

The American National Red Cross, the only voluntary agency with quasi-official status, is regarded as the official disaster relief agency of the United States. The activities of the agency, however, are not limited to this function. The organization performs other important services, many of which are prevention related. Community Educational and Health Programs include: nursing and health programs that sponsor classes in home nursing, mother's aide, and mother and baby care; safety programs that sponsor courses in first aid, small craft operation, swimming, and water safety; and Red Cross Youth Service Programs in health and safety.

D. EXECUTIVE OFFICE OF THE PRESIDENT

1. Council on Environmental Quality (CEQ) and Office of Environmental Quality

The CEQ was established by the National Environmental Policy Act of 1969 to formulate and recommend national policies to promote the improvement of the environment. The Office of Environmental Quality, which provides staff support for the Council, was authorized by the Environmental Quality Improvement Act of 1970. The chief functions of the CEQ are:

- to review and appraise Federal programs having an impact on the environment;
- to recommend policies for protecting and improving the quality of the environment;
- to assist in coordinating Federal environmental programs that involve one or more agencies;
- to assist in the preparation of the President's annual report to the Congress;
- to undertake special studies and analyses related to environmental issues.

In 1978 certain functions of the CEQ (i.e., those dealing with the analysis and evaluation of environmental and conservation effects of nonnuclear energy research and development activities) will be transferred to the Environmental Protection Agency.

2. Council on Wage and Price Stability

Created in 1974 as an agency responsible for identifying, analyzing, and evaluating inflationary influences both in the private and public sectors, the Council's prevention-related activities include: financing of environmental programs of quality control and pollution abatement in such areas as water and noise; highway safety program standards; labeling of estrogens to assure information to consumers on potential risks and side effects; percentage ingredient labeling of baby food; motor vehicle safety standards; and, occupational health and safety standards for general industry and agriculture and for noise exposure.

3. Domestic Policy Staff (Formerly Domestic Council)

The Domestic Council was established in 1970 to formulate and coordinate domestic policy recommendations to the President. The Reorganization Plan of 1977 transferred to the Domestic Council certain functions of the former Office of Drug Abuse Policy to focus on drug abuse with the objective of reducing the incidence, as well as the costs, of drug abuse in the United States, and of developing and assuring the implementation of a comprehensive, coordinated strategy to combat drug abuse.

4. Office of Management and Budget (OMB)

OMB's chief purpose is to develop a more efficient and economical governmental operation. As supervisor and controller of the administration of the budget, OMB plays a powerful role in policy formulation by holding the purse strings that apportion budget appropriations at the executive level among the various Federal agencies and programs. Program activities within OMB are divided into these general areas: national security and international affairs, human resources (veterans and labor), economics and government, natural resources, energy, and science, management and regulatory policy.

5. Office of Science and Technology Policy (OSTP)

An advisory office created in May 1976 to serve as a source of scientific and technological analysis and judgment for the President with respect to major Federal policies, plans and programs, OSTP's responsibilities include preparation of an annually updated 5-year outlook highlighting current and emerging problems identified by scientific research, and opportunities for and constraints to the use of science and technology to contribute to their solution and to Federal objectives and national goals. OSTP has recently completed a study examining basic questions about the responsibility for nutrition research.

6. President's Commission on Mental Health

This temporary commission was established in February 1977 to recommend how the mental health needs of the Nation can be met and to identify the relative priority of those needs. A preliminary report was presented to the President in September of 1977, and a final report in April of 1978.

E. LEGISLATIVE BRANCH

1. Congressional Budget Office (CBO)

CBO was created in 1974 to provide the Congress with detailed budget information and studies of the budget impact of alternative policies.

CBO's Division of Natural Resources and Commerce prepares analyses of program and budget issues in the areas of energy, environment, natural resources, science, agriculture and rural development, commerce, transportation, and communications.

The Human Resources and Community Development Division provides analyses of program and budget issues in the areas of income assistance, education, employment, health, veterans' affairs, community development, and housing.

2. Congressional Research Service (CRS)

A department of the Library of Congress, CRS functions exclusively for the legislative branch, providing support resources for members and committees of the Congress and accommodating a large range of congressional requests for background papers, analyses of bills and legislative proposals, assistance in hearings and other phases of the legislative process, factual statements and bibliographies on all subjects of interest to the Congress.

Of the eight research divisions, three deal with prevention-related subjects:

- Education and Public Welfare Division—provides assistance in the development of many aspects of social legislation;
- Environmental Policy Division—provides assistance on a variety of environmental and energy-related issues;
- Science Policy Research Division—provides assistance in the field of health policy.

3. General Accounting Office (GAO)

GAO is responsive directly to the Congress for conducting independent reviews, audits, and investigations of programs, activities, and final transactions of Federal agencies. "Delays in Setting Workplace Standards for Cancer-Causing and Other Dangerous Substances," May 10, 1977, is an example of such a report to the Congress by the Comptroller General of the United States, General Accounting Office. This report was made because of widespread congressional and public interest in the Government's activities under the Occupational Safety and Health Act of 1970.

4. Office of Technology Assessment (OTA)

An advisory arm of the Congress, OTA's basic function is to provide congressional committees with an objective source of information and assessment to identify the broad range of consequences, social as well as physical, that can be expected to accompany various policy choices affecting the uses of technology. OTA's assessment activities cover six priority areas, one of which is health.

- The Health Assessment Program has dealt with such subjects as drug bioequivalence, medical malpractice, medical technologies, hospital outpatient services, medical records, and health information.

Four other assessment programs deal in some part with health-related matters:

- Oceans Assessment Program—deals with some of the environmental consequences of offshore development and the new use demands on coastal and offshore areas in various parts of the country;
- Transportation Assessment Program—addresses various policy issues grouped around the common theme of a perceived need for safer, less costly, and more energy-efficient means of meeting national transportation needs;
- Energy Assessment Program—includes assessments of the potential impact of new energy sources;
- Food Assessment Program—addresses itself to the problem of improving the quality of agricultural and nutritional information that forms the basis for congressional policy decisions in food-related areas.

SUMMARY OF AGENCIES OUTSIDE HEW WITH PREVENTION ACTIVITIES

A. DEPARTMENTS

1. Department of Agriculture

Agricultural Research Service
Animal and Plant Health Inspection Service
Cooperative State Research Service
Economics, Statistics, and Cooperative Service
Extension Service
Farmers Home Administration
Food and Nutrition Service
Food Safety and Quality Service
Forest Service

2. Department of Commerce

Maritime Administration
National Oceanic and Atmospheric Administration
National Fire Prevention and Control Administration

3. Department of Defense

4. Department of Energy

5. Department of Housing and Urban Development

6. Department of the Interior

Bureau of Land Management
Bureau of Mines
Bureau of Outdoor Recreation
Geological Survey
National Mine and Safety Academy
National Park Service
Office of Surface Mining Reclamation and Enforcement
United States Fish and Wildlife Service

7. Department of Justice

Antitrust Division
Criminal Division
Land and Resources Division
Drug Enforcement Administration
Law Enforcement Assistance Administration

8. Department of Labor

Mine Safety and Health Administration

Occupational Safety and Health Administration

9. Department of Transportation

Coast Guard

Federal Aviation Administration

Federal Highway Administration

Federal Railroad Administration

National Highway Traffic Safety Administration

Research and Special Programs Directorate

Transportation Systems Center

Urban Mass Transportation Administration

10. Department of Treasury

Bureau of Alcohol, Tobacco and Firearms

United States Customs Service

B. INDEPENDENT AGENCIES

1. ACTION
2. Appalachian Regional Commission
3. Community Services Administration
4. Consumer Product Safety Commission
5. Environmental Protection Agency
6. Federal Maritime Commission
7. Federal Mine Safety and Health Review Commission
8. Federal Trade Commission
9. General Services Administration
10. National Aeronautics and Space Administration
11. National Science Foundation
12. National Transportation Safety Board
13. Nuclear Regulatory Commission
14. Occupational Safety and Health Review Commission
15. Small Business Administration
16. Tennessee Valley Authority
17. Veterans Administration

C. QUASI-OFFICIAL AGENCIES

1. National Academy of Sciences
2. Smithsonian Institution
3. The American National Red Cross

D. EXECUTIVE OFFICE OF THE PRESIDENT

1. Council on Environmental Quality
2. Council on Wage and Price Stability
3. Domestic Policy Staff
4. Office of Management and Budget
5. Office of Science and Technology Policy
6. President's Commission on Mental Health

E. LEGISLATIVE BRANCH

1. Congressional Budget Office
2. Congressional Research Service
3. General Accounting Office
4. Office of Technology Assessment

VI. SETTING PREVENTION PRIORITIES

As outlined in Section II, Health Status Goals, the objectives of a national prevention strategy are to eliminate or reduce the incidence and prevalence of preventable factors which increase risk of disease, and to promote and enhance the well-being of the public. This report identifies a broad range of actions which could be taken to promote healthier habits, ameliorate adverse environmental exposures, and strengthen delivery of preventive services. While all have merit, they obviously do not all have equal merit. The purpose of this section is to review the issues related to the development of criteria by which to differentiate among the various strategies in identifying those which hold the greatest promise.

A. DEFINITION OF THE PROBLEM

The first aspect in priority setting is the magnitude of the disease or condition to which the proposed program is addressed, including the distribution in the population of personal behaviors which have major effects on the disease or conditions, and the extent of the environmental factors which contribute to the disease and condition. For each program, therefore, we should take into consideration the following criteria regarding the magnitude of the problem:

- number of persons affected (or at risk)
- severity of the problem—long-term sequelae, amount of disability or activity restriction, risk of premature death
- duration of the effect
- number of potential life-years lost
- cost to society (as a special case, since reliable data require careful, thorough analyses)

B. CRITERIA FOR PROGRAM PROPOSALS

Thorough consideration of all modalities for reaching a given health status goal produces a number of options for program proposals. These generally involve using preventive health services, environmental control measures, and promotion of individual behavior change, alone or in combination. In setting priorities, therefore, these options and their characteristics should be assessed on the basis of the following criteria:

- Methods of intervention are empirically established, biologically sound, and effective.

- Intervention must protect against onset of disease, delay onset, lessen the severity of disease or reduce the cost of treatment.
- Program proposal must contribute substantially to acquisition of additional evidence concerning the effectiveness of intervention or contribute substantially to the application of the intervention.
- Morbidity and mortality created by the intervention appear to be significantly less than the gains of the intervention with respect to morbidity and mortality.
- The intervention must be acceptable to consumers.
- The proposal must be affordable.
- The proposal must be economically and politically feasible.

C. SOME INDICATORS OF PROBLEM MAGNITUDE

The following five tables provide some indicators of the problems which pose the most significant threat to the population as a whole. They do not, of course, provide data on which risk factors associated with the problems are most subject to intervention, nor do they indicate which risk factors are important as a result of their cutting across several problem areas.

Table 1.—Ten Leading Causes of Death

[Total U.S. population aged 1+, 1975]

Cause	Number of deaths	Rate per 100,000	Percent of total
Heart disease	715,472	340.78	38.8
Cancer	365,549	174.11	19.8
Cerebrovascular disease	193,859	92.33	10.5
All other accidents	56,046	26.70	3.0
Influenza and pneumonia	53,456	25.46	2.9
Motor vehicle accidents	45,573	21.71	2.5
Diabetes	35,219	16.78	1.9
Cirrhosis of liver	31,581	15.04	1.7
Arteriosclerosis	28,882	13.76	1.6
Suicide	27,062	12.89	1.5

Table 2.—Years of Potential Life Lost

[Total U.S. population aged 1–74, 1975]

Cause	Total years lost	Percent total years
Heart disease	4,471,254	23.8
Cancer	3,841,801	20.5
Motor vehicle accidents	1,838,602	9.8
All other accidents	1,568,618	8.4
Cerebrovascular disease	869,352	4.6
Suicide	824,038	4.4
Homocide	823,257	4.4
Cirrhosis of liver	583,727	3.1
Influenza and pneumonia	370,324	2.0
Diabetes	268,726	1.4

Table 3.—Days of Care in Non-Federal Short-Stay Hospitals, 1974[1]

Cause	Days per 1,000	Cause	Days per 1,000
Cardiovascular disease	230.3	Respiratory disease	94.8
Digestive disease	154.9	Musculoskeletal disease	77.6
Accidents, poisonings, violence	138.8	Complications of pregnancy	71.4
Cancer	117.5	Nervous system disease	43.6
Genitourinary disease	103.1	Endocrine and metabolic disease	41.9

[1] Health, United States, 1976–77.

Table 4.—Direct Cost of Illness, 1972[1]

[Hospital, physicians, drugs, etc.]

Cause	Percent of total (all diseases)	Cause	Percent of total (all diseases)
Digestive disease	14.8	Accidents, poisonings, violence	6.8
Cardiovascular disease	14.5	Genitourinary disease	5.9
Mental disorders	9.3	Cancer	5.1
Nervous system disease	7.9	Musculoskeletal disease	4.8
Respiratory disease	7.9	Endocrine and metabolic disease	4.6

[1] Cooper and Rice DHEW Publication Number (SSA) 76–11703.

Table 5.—Total Cost of Illness, 1972[1]

[Medical care cost, loss to economy]

Cause	Percent of total (all diseases)	Cause	Percent of total (all diseases)
Cardiovascular disease	21.4	Mental disorder	7.9
Accidents, poisonings, violence	12.4	Nervous system disease	6.1
Digestive system	9.7	Musculoskeletal disease	5.1
Respiratory system	9.0	Genitourinary disease	3.6
Cancer	8.9	Infectious disease	1.8

[1] Cooper and Rice, DHEW Publication Number (SSA) 76–11703.

The changing priorities emerging from the different approaches to presenting the problem are obvious. As the focus shifts from absolute mortality to potential years of life lost, those which predominantly afflict the young become more important. Examples include motor vehicle accidents and homicide, with influenza, pneumonia and diabetes dropping down on the list. As the focus shifts from mortality to morbidity, using short-term hospital days as an indicator, diseases related to the digestive system, the genitourinary system, and pregnancy are more prominent. Looking further to the costs of illness, still different priorities surface, with mental diseases presenting significant problems. There is a clear need to determine ways to accommodate these many factors in setting priorities for national programs.

D. AN EXERCISE IN PRIORITY SETTING

In February and April of 1978 the Programs and Policies Advisory Committee of the Center for Disease Control (CDC) undertook to identify high, medium, and low priority problems which directly contribute to unnecessary morbidity and mortality. Indirect problems, such as those related to access to care, were not considered. To do this, the CDC asked its panel of experts to classify the problems by considering the following factors:

(1) Prevalence of the health problem
(2) Mortality and/or decreased quality of life for the individual afflicted
(3) Technical feasibility of successful intervention
(4) Impact on health care costs (in some cases).

By priority area, the following guidelines were employed:

- *High priority.* A large decrease in morbidity and/or mortality is predictable if appropriate measures to control this problem are implemented, and/or an unacceptable increase in morbidity and mortality is predictable if measures to control this problem are discontinued.
- *Medium priority.* A moderate decrease in morbidity and/or mortality is probable if appropriate measures to control this problem are implemented, and/or an undesirable increase in morbidity and mortality is probable if measures to control this problem are discontinued.
- *Low priority.* A small (but significant) decrease in morbidity and/or mortality is expected if appropriate measures to control this problem are implemented, and/or a tolerable increase in morbidity and mortality is expected if measures to control this problem are discontinued.
- *No priority.* An insignificant decrease in morbidity and/or mortality is expected if appropriate measures to control this problem are implemented, and/or an insignificant increase in morbidity and mortality is expected if measures to control this problem are discontinued.

As a result of this effort, the following categories were identified:

High Priority Health Problems

(Alphabetical Order)

Alcohol and its consequences.

Cancers of medium to high incidence subject to potential prevention or controllable by appropriate intervention when detected early (lung, breast, colon/rectal, cervix/uterus, prostate, skin).

Cardiovascular diseases of medium to high incidence and subject to successful intervention.

Contamination of drinking water.

Dental diseases (notably caries and periodontal disease).

Diseases caused by substances in workplace.

Infant mortality.

Motor vehicle accidents.

Newly recognized diseases and unexpected epidemics of public health significance.

Nosocomial infections.

Smoking and its consequences.

Vaccine preventable diseases of children (diphtheria, pertussis, tetanus, polio, measles, rubella, mumps).

Problems of High Priority for Special Consideration [1]

Social disorders.

Stress.

Medium Priority Health Problems

(Alphabetical Order)

Air pollution.

Arthritis/rheumatism.

Cancer—lip, mouth, pharynx, bladder, vagina.

Central nervous system—Parkinsonism.

Dermatoses.

Diabetes.

Disaster.

Encephalitis.

Epilepsy.

Fungal infection.

Genetic disease—mental retardation, sickle cell anemia, Down syndrome, P.K.U., hypothyroidism, Rh, neural tube defects, Tay Sachs.

Inappropriate use of medical services and pharmaceutical products.

Influenza.

Leprosy.

Mental health (suicide, psychoses, psychoneuroses, family living, problems of the elderly, personality disorders, depression).

Mycobacterial respiratory disease.

Nutrition-related problems.

Occupational accidents.

Rabies.

Recreational drugs.

Renal disease.

Salmonellosis.

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[1] The problems of social disorders and stress were felt deserving of special consideration. They clearly contribute greatly to unnecessary morbidity and mortality in this country. However, the causes are multiple and are too complex to be approached without more specific definition, especially for their vulnerabilities to prevention. The committee urged that CDC convene a panel of experts to define these problems in more detail, enumerate their causal components, and determine whether or not appropriate strategies can be developed.

Unwanted pregnancy.
Venereal disease and its complications.
Vision impairment.

E. REVIEW OF PRIORITIES

It is obvious from a review of the leading causes of morbidity and mortality, as well as from the priority-setting exercise of the CDC advisory group, that a number of the major threats to health in the United States can be prevented or reduced with a concentrated effort. While it is important to conceptualize the problems in terms of the diseases which are to be reduced, it is necessary to set program priorities by the activities of greatest potential to reduce the diseases.

Accordingly, the following activities may be identified as important foci of agency programs:

1. Health Promotion Designed for Population Groups

(a) Smoking
(b) Alcohol abuse
(c) Nutrition
(d) Exercise
(e) Adherence to antihypertensive therapeutic regimen

These 5 behaviors may have between them significant impact on 7 of the 10 leading causes of mortality (heart disease, cancer, cerebrovascular disease, arteriosclerosis, diabetes, traffic accidents, and cirrhosis of the liver), and possibly an eighth (suicide). If effective measures could be deployed to promote healthier habits, their incidence could be substantially reduced.

(f) Social isolation

Recent findings from the Alameda County Population Laboratory indicate that a factor for "isolation" of an individual may have a significant impact on mortality, due to all causes. Social isolation of the elderly is a particularly prominent concern.

2. Health Protection Designed for Population Groups

(a) Labeling (food, alcohol, tobacco, drugs)
(b) Occupational hazard monitoring
(c) Toxicology testing (including carcinogenesis, mutagenesis, and teratogenesis)
(d) Motor vehicle standards
(e) Speed law enforcement
(f) Road design
(g) Gun use control
(h) Fluoridation of water

Effective employment of the above health protection measures could have a substantial impact on some of the lifestyle factors important in disease, on motor vehicle accidents, on dental disease, and on morbidity/mortality due to occupational exposures.

3. Personal Preventive Health Services Provided to Individuals

(a) Maternal and child health services (including neonatal screening)
(b) Family planning services
(c) Hypertension screening
(d) Immunization (childhood diseases and influenza for the chronically ill)
(e) Cholesterol screening
(f) Cervical cancer screening
(g) Glucose screening
(h) Test for occult gastrointestinal bleeding
(i) Counseling for the lifestyle factors noted above, plus breast self-examination
(j) Home visiting or partnership arrangements

The services noted above, if effectively employed for high-risk groups, could have an important impact on the major causes of mortality (with the exception of nonvehicular accidents and homicide). Many other services are, of course, important to reduced morbidity, including VD diagnosis and followup, EKG, vision and hearing screening.

VII. RECOMMENDATIONS

This report has reviewed a broad range of measures which can be employed to reduce unnecessary morbidity and mortality in Americans. It has noted that effective measures to improve our environment, to facilitate the provision of personal preventive health services, and to enhance our lifestyles have important potential for developing a healthier people. But not all measures are equally important or efficacious. And not all measures lie directly within the responsibility of this Department. Examples of important areas not principally the responsibility of HEW include those related to problems presented by firearms and highways, and much of the health and safety regulation. On the other hand, there is a great deal which can be done by HEW to improve the national prevention effort.

The Department has already begun to move forcefully to give new emphasis to many of the problems in prevention. Major initiatives have been launched in childhood immunization, smoking and health, and teenage pregnancy. Similar emphasis is needed for nutrition, alcohol abuse, and environmental toxicology. In each of these efforts, children and pregnant women should comprise the primary target groups.

In addition to major programs in the areas just noted, there is a need to strengthen efforts in other areas, and in activities which have impact across several problems. A commitment must be made to ensure the delivery of preventive services in the Department's direct services delivery programs. Research which is designed for application in disease prevention must be made more competitive with research designed for disease treatment and basic undirected research.

Listed in "A" below are a number of priority problem areas identified in the course of the Task Force operation as meeting important criteria for prevention: These are (1) predominant factors in disability or death; (2) amenable to intervention; (3) currently supported at inadequate levels, hence most likely to yield significant benefits at the margin; and (4) prominent societal concerns.

This section will first review by problem area the recommended activities for strengthening departmental efforts in each area, and then will review by strategy element (noted in section III) the implications of these recommendations for departmental programs. An analysis of current budgetary authority for each program element has been forwarded to the Secretary with recommendations as part of the budgetary proposals for fiscal year 1980.

A. PRIORITY AREAS

1. Smoking and Health

Smoking is the first-ranking public health problem in the United States today. While significant reduction in adult male smoking has occurred since the first Surgeon General's Report on Smoking and Health in 1964, female smoking has increased and reached a dubious parity with male smoking. Similarly, the trend among teenagers and even preteens is a cause for concern. The causal link between smoking and lung cancer is firmly established and other cancers, other lung disease, heart disease, and effects on the fetus, are clearly associated. Health outcomes associated with reduction in smoking would include:

- Reduction in the incidence of coronary heart disease (recent declines in cardiovascular disease mortality are a promising sign that adult male smoking reductions, and dietary changes, among other risk factors, are having some effect).
- Reduction of risk to women who take oral contraceptives, and workers in certain hazardous occupations.
- Reduction in the incidence of poor pregnancy outcomes.
- Enhanced physical well-being for ex-smokers.
- Reduction of eye irritations, nuisance, and possibly serious illness to nonsmokers.
- Reduction of death and disability from burns, smoke inhalation, and trauma from cigarette-related fires.

The recommended program contains the following elements:

(a) General information campaign on smoking and health.
(b) Support for community risk reduction trials which incorporate smoking cessation activities.
(c) Project grants to States for programs related to smoking and health.
(d) Special information and education targeted at specific high-risk groups, such as pregnant women and workers in certain occupations.
(e) Expanded research, including epidemiologic studies.
    (1) Improved smoking cessation techniques.
    (2) Health effects of smoke on nonsmokers.
    (3) Identification of individuals at higher risk from smoking.
    (4) Study of interaction between smoking and environmental and occupational exposures.
    (5) Interaction between smoking and therapeutic drugs.
(f) Reduction of nicotine and/or other harmful substances in tobacco products.
(g) Pursuit of incentives, including insurance premium discounts and tax policy, to discourage smoking.
(h) Stronger regulations, such as commercial aviation restrictions, advertising and warning label regulations, and State and local ordinances.

(i) Leadership for a national program to reduce the number of smokers and the amount smoked.

2. Nutrition

Recommended actions in nutrition cut across all three target areas (health promotion, health protection, and personal preventive services), and address a number of health status goals; e.g., reduction of chronic disease, enhanced development of children and adolescents, and enhanced general physical well-being.

The data on overnutrition indicate that one male in seven, and one female in five, are obese. Pediatric obesity is a special concern, since the data suggest that early weight problems establish a propensity to lifelong weight problems. (In addition to nutrition activities, the recommended programs under Exercise will help in this area.)

Not only is the national diet excessive in terms of total calories, but it also is poorly distributed in sources of calories. Total fat intake, especially animal fats, refined carbohydrates, and salt should be reduced as part of a prudent diet. Good nutrition is especially important in pregnancy and in early childhood.

Health outcomes associated with good diet include:

- Reduction of obesity and its health concomitants (such as reduced longevity, midlife onset of diabetes mellitus, aggravated arthritis, reduced self-esteem, and reduced general well-being).
- Probable improvement in cardiovascular health, from reduced fat and salt in the diet.
- Improved outcomes of pregnancy in high-risk individuals such as pregnant teenagers.
- Lessened risk of dental disease, by reducing sugar in the diet, consuming carbohydrates only at mealtimes, and consuming fewer adhesive foods.

The recommended program contains the following elements:

(a) Expanded provision of nutrition education—in schools, in grant-supported State and local health agency education programs, in primary care programs, and in patient education programs.

(b) Negotiation with the food industry to reduce the sugar content of foods on a gradual basis by one-half, especially foods for children, such as breakfast cereals; to reduce animal fat content of processed foods (e.g., sausage); and to reduce the salt in processed foods. The restaurant industry should be included (e.g., reduced fat percentage in hamburgers).

(c) Additional research, both specific to the role of nutrients in health and disease, and behavioral studies associated with health behavior and personal choice.

   (1) Establishment of a Clinical Nutrition Research Center at the Clinical Center of the National Institutes of Health.

   (2) Increased funding for selected clinical nutrition units in academic centers.

        (3) Role of nutrition in cancer.
        (4) Role of nutrition in cardiovascular diseases.
        (5) Eating behavior in obesity.
        (6) Role of maternal nutrition in fetal development and nutrition in the premature infant.
        (7) Relationship between nutrition and behavior in childhood.
        (8) Establishment of nutrient toxicity levels for all essential nutrients.
        (9) Investigation of nutrient interactions (including food additives, drugs, other nutrients, and environmental contaminants).
        (10) Determinants in consumer food selection.
        (11) Evaluation of techniques of nutrition education.
    (d) Expanded nutrition surveillance and monitoring activities as part of a national prevention data base.
    (e) Training for an additional 1,100 public health nutritionists over a 5-year period.
    (f) Development of departmental labeling regulations which promote better public understanding of the content and value of food products.
    (g) Closer coordination between the feeding programs for women, infants, and children, and other prevention programs for mothers and children.

3. Alcohol Abuse

As indicated in section II, alcohol abuse and related illness cause an enormous public health problem, rivaled only by smoking in total impact. Primary prevention has proven difficult, both conceptually and in practice. Education has been the main prevention strategy, along with public policies restraining its use. Research remains an important need as well.

Since personal choice about alcohol use and abuse is probably closely related to personal choice about other lifestyles, including drugs and tobacco use, as well as general emotional well-being, prevention programs in the lifestyle area will be interrelated. The lifestyle inventory, for example, shows a considerable array of ADAMHA programs addressing several health-related behaviors beyond those targeted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

A special case for prevention is fetal alcohol syndrome (FAS), which may be the third most frequently occurring birth anomaly. Prevention would be focused on eliminating drinking among pregnant women. Pregnant women provide a clearly identifiable target group for education via alcohol warning labels or other approaches.

Results of the recommended programs would have the following health outcomes:

- Reduction in birth defects (FAS).
- Improved knowledge on which to base better primary prevention approaches.

- Retarded progression of moderate alcohol drinkers to problem drinking levels.
- Reduction in driving accidents and fatalities related to drinking, particularly accidents involving teenagers.
- Continued reduction in cirrhosis deaths.
- Possible reduction in alcohol-related cancers.

The proposed program contains the following elements:

(a) Establishment of a program to prevent alcohol abuse/alcoholism among children and adolescents, including:
  (1) Education on alcoholism as an integral component of comprehensive school health education programs developed by PHS and OE.
  (2) Youth demonstration programs.
  (3) Multimedia programs for youth.
  (4) Study of teenage alcohol-related morbidity and mortality (particularly highway deaths).

(b) A national program on FAS.
  (1) Public and professional education on FAS (including labeling).
  (2) Research on FAS.
  (3) Linking FAS education with family planning counseling programs, as part of risk-benefit information for persons considering contraception.
  (4) Programs to extend awareness of women's alcohol-related programs.

(c) Development of a program to sensitize health, education and social service professionals to alcohol problems.
  (1) Improving the role of health care professionals in the prevention of alcohol problems among youth.
  (2) Training of professionals and paraprofessionals in primary prevention of alcoholism, including new trainees and those already in the field.

(d) Prevention of alcohol abuse/alcoholism in occupational settings through:
  (1) Community-based demonstration programs in primary prevention of alcoholism.
  (2) Demonstrations of comprehensive wellness programs for the worksite.

(e) Development of an informative labeling policy for alcoholic beverages, including ingredient labeling, warnings against operating automobiles or other machinery, and health hazard warnings for women during pregnancy.

(f) Increasing the penalties and enforcement of laws for abusive drinking, particularly as related to driving.

(g) Studies and public policy analyses to identify the most effective operations by which communities affect the patterns of drinking (e.g., pricing, restriction on sales, etc.).

(h) Early recognition and treatment of the alcoholic, as a deterrent to the occurrence of other alcohol-related problems.

4. Exercise and Fitness

The ordinary tasks of living, for large numbers of Americans, no longer provide enough vigorous exercise to develop and maintain good muscle tone or cardiovascular or respiratory fitness. Homes, factories, even farms, now contain numerous labor-saving devices for jobs which once demanded physical activity. Walking long distances and climbing stairs have virtually been eliminated from daily life. Even in recreation, the influence of television has reduced the stimulus to play in physically active ways. Children sit in captive idleness for countless hours of their playtime, watching TV.

We know that 45 percent of American adults never engage in meaningful physical activity or exercise; and, of the 55 percent who do, most do not meet the minimum time recommendations of medical authorities. This pervasive inactivity, together with poor living habits, has resulted in a serious national fitness problem. Obesity is one obvious concomitant, another is diseases of the heart and blood vessels.

It seems reasonable, therefore, to increase our efforts to encourage Americans to exercise, to design programs which help them do so, and to remove barriers which deter them. Most Americans associate fitness with athletic performance, many fewer associate it with good health, improved appearance, or better job or school performance. This is especially true among people who are poor, elderly, or less educated.

The results of improved exercise would include:

- Better weight control, and better energy/caloric intake balance.
- Improved cardiovascular fitness.
- Improved well-being, self-esteem, and management of stress.

The recommended program contains the following elements:

(a) Incorporation of exercice programs in occupational wellness demonstration programs. Emphasis on aerobic exercise.

(b) Development of Federal matching grants for State and local programs in exercise and fitness—awards would be small, seed money funds to set up programs.

(c) Emphasis on fitness in school lifestyle education programs; special target—to identify underdeveloped or obese children and involve them in physical activity.

(d) Improved media spots promoting exercise, targeted to non-middle class audiences.

(e) Negotiation with the Treasury Department to assess the cost and incentive value of tax credits to industry for qualified fitness/lifestyle programs.

(f) Negotiation with the Department of Transportation to make highway trust funds available for fitness trails, and with the Department of the Interior for community fitness programs.

(g) Negotiation with the insurance industry to encourage preferential health and life insurance rates for regular exercises (determined by pulse rate).

- (h) Expanded research into health benefits of fitness.
  - (1) Epidemiologic studies of the role of exercise in cardiovascular disease.
  - (2) Physiologic studies of exercise in relation to cardiopulmonary function and musculoskeletal stress.

5. Hypertension

High blood pressure silently affects between 30 and 50 million Americans, ultimately killing or disabling several hundred thousand each year through stroke, renal failure, and heart attack. Because it is asymptomatic, a large number of hypertensives are unaware of their high risk. Prevention of complications is possible by means of early detection with a simple, reliable, noninvasive procedure, and subsequent diagnosis and treatment. Diuretic medications have been shown to prevent at least cerebrovascular accidents and possibly other sequelae. For many persons at risk of hypertension, control of body weight and reduction of salt in the diet may prevent or delay the onset of hypertension.

Treatment of hypertension is a lifetime proposition, and key variables in cost-effectiveness are costs of medication and adherence to correct treatment regimens. A thorough cost-benefit analysis seems warranted, using field data from projects which incorporate hypertension programs in a general wellness approach, and netting out the savings from reduced complications (high medical costs for renal disease, stroke, etc.). However, since there is no evidence that a favorable cost-benefit relationship would not emerge, we should move to expand current programs and activities in hypertension prevention.

The proposed programs would have the following health-related outcomes:

- reduction of stroke
- fewer heart attacks
- fewer deaths due to kidney disease.

The proposed program contains the following elements:

- (a) Expanded grant-support for State and local hypertension control programs including some demonstration projects covering treatment.
- (b) Increased high blood pressure education program activities.
- (c) Expanded behavioral research which includes a study of factors which influence use of preventive health services and compliance with medical regimens.
- (d) Incorporating high blood pressure programs in at least two wellness demonstration projects, building in data acquisition for a thorough cost-benefit analysis.
- (e) Nutrition activities which contribute to reduced salt content in the diet and reduced prevalence of obesity (see 2) and exercise activities which contribute to reduced prevalence of obesity (see 4).

(f) Increased hypertension activities in federally supported primary care projects awarded supplemental grant funds for prevention.

6. Child Health

Child health is a major priority of HEW programs—e.g., PHS programs targeted to children, HCFA's program under EPSDT and the CHAP legislation which the Department has submitted, HDS programs, and OE education in health-related areas. Several recent HEW initiatives have targeted children as well—e.g., teenage pregnancy, the Immunization Initiative, the Smoking and Health program, and the proposed Child Health Initiative.

Children are a specific focus of three health status goals in section II of this report: infant mortality; mental retardation and congenital defects; enhanced development. Obviously, all strategy targets are generally applicable to children.

The strategy elements proposed in section III of this report accommodate the prevention components of current HEW initiatives as well as the proposed school health initiative. In addition, a number of further actions are covered by other recommendations in this report which will improve the health of children. The proposed programs would include the following health outcomes:

- Fewer children choosing to smoke in the future.
- Reduced incidence of childhood immunizable diseases.
- Better dietary knowledge and patterns of eating.
- Improved physical fitness.
- Reduced incidence of dental disease.
- Fewer unwanted children, infant deaths, and birth defects among children born to teenage mothers.
- Reduced fetal alcohol syndrome incidence.

Recommended programs contain the following elements:

(a) Smoking education—see Priority Area 1.
(b) Nutrition education, food modification—see Priority Area 2.
(c) Fitness activities in school health programs—see Priority Area 4.
(d) Adolescent pregnancy prevention and parenting education—see Priority Area 7.
(e) Injury control programs—see Priority Area 14.
(f) Strengthen the Immunization Initiative efforts, particularly the establishment of an effective ongoing system.
(g) Fluoridated water, dental preventive services, and oral hygiene education—see Priority Area 10.
(h) Fetal alcohol syndrome prevention—see Priority Area 3.
(i) Expanded genetic disease programs.
    (1) Expanded prenatal and neonatal screening services through project grants to States and localities.
    (2) Improved counseling services for genetic diseases.

        - (3) A public information program on genetic diseases, targeted to teenagers.
        - (4) Expanded research in the detection of genetic diseases.
    - (j) Expanded research into the childhood determinants of behavior related to health habits.
    - (k) Establishment of prominent school health office in OE to facilitate development and dissemination of comprehensive school health education curricula.
    - (l) Development of health demonstration projects in schools.
        - (1) Provision of certain health services in schools (e.g., immunizations, fluoride treatments, vision screening).
        - (2) Pilot projects using school nurse practitioners for expanded school health education and services.
        - (3) Focus on medically underserved areas.
    - (m) Special program to reduce infant death.
        - (1) Concentrated effort to identify high-risk pregnancies.
        - (2) Thorough investigation and documentation of every infant death to identify those which are preventable.

7. Adolescent Pregnancy

Adolescent pregnancy is a continuing national problem the dimensions of which include unwanted initial and repeat pregnancies, adverse social and psychological consequences for the teenage parents and high health risks for mother, fetus, and child. One million young women under age 19 become pregnant annually, 600,000 of whom give birth, and 85 percent keep their babies.

Failure of sexually active youth to use contraceptives has many causes—lack of access to family planning services, lack of knowledge, and lack of skills to choose healthy lifestyles. The lack of maturity to cope with sexuality in adolescents who become pregnant is often accompanied by lack of awarness of other risk factors, such as cigarette smoking, drugs, alcohol, nutrition, and use of prenatal care, which will affect the health of their babies.

The HEW Adolescent Pregnancy Initiative has proposed an expanded program of services, education, research, and training to respond to this problem. Many of these new activities are aimed at prevention of teenage pregnancy and its sequelae.

The proposed program would have the following health-related outcomes:

- Reduction in the number of conceptions among teenagers.
- Increased access to family planning, pre- and post-natal care, and social services.
- Increased skills to deal with sexuality and adhere to contraceptive practices.
- Increased knowledge of risk factors and skills to make decisions, including parenting, among teenagers who become parents.
- Reduction in low-birth weight infants, infant mortality, and infants with mental retardation and congenital anomalies.

The proposed program contains the following elements:

(a) Provision of health and social services to pregnant teenagers.
(b) Community-based coordination and gap-filling services.
(c) Demonstration programs for community and school-based sex education.
(d) Contraceptive development and evaluation.
(e) Expanded research into educational and behavioral strategies to prevent unwanted adolescent pregnancy and to promote adolescent health.
(f) Smoking reduction activities—see Priority Area 1.
(g) Nutrition activities—see Priority Area 2.
(h) Fetal alcohol syndrome—see Priority Area 3.

8. Environmental Toxicology

Environmental influences on health, as detailed in this report, are pervasive and growing public health problems. Many areas of environmental protection are the direct responsibility of other agencies (e.g., highway and automobile safety, air and water pollution) or partially within the purview of the Department (e.g., toxic and carcinogenic agents). Many areas usually grouped under the term environmental health, such as lead poisoning prevention and water fluoridation, are the primary responsibility of HEW. Occupational health incorporates a number of concerns related to toxicology and is discussed separately under 9 below.

The program proposed here singles out the toxics area of environmental health for special emphasis. Potentially dramatic health hazards are posed by the vast number and volume of substances which are finding their way into our environment as a result of the revolution in synthetic chemistry over the last generation. Processes in manufacturing, agriculture, and combustion are delivering new substances into our air, water, food, and even clothing and cosmetics at a very rapid rate. Environmental toxins are known to contribute to a number of health problems, including chronic diseases, cancer, and birth defects. Between $300 and $500 million is currently spent across the government in this area, but the importance of the potential problems demands additional investment.

The proposed program would have the following health-related outcomes:

- Reduction in birth defects.
- Reduction in chronic degenerative diseases, such as heart disease, hypertension, kidney disease, and emphysema.
- Reduction in cancer.
- Reduction in neurologic disease.
- Possible reduction in certain behavioral disorders.
- Reduction in immunologic disease.

The proposed program contains the following elements:

(a) Establishment of a National Toxicological Research Center.
(b) Establishment of a mechanism to ensure HEW participation in health-related decisions of regulatory agencies.

(c) Expanded research and testing in environmental toxicology. (See appendixes for greater detail on Interagency Regulatory Liaison Group (IRLG) recommendations.)
  (1) Expanded laboratory research, including the development of short-term tests, the development of model ecosystems, the definition of interactions between hazardous substances, and the development of early indicators of toxicity and more predictive animal models.
  (2) Expanded clinical research, including test methods to identify exposure to toxic hazards, and epidemiologic studies of problems occurring in populations at risk.
  (3) Improved work on exposure analysis, including sampling and analytic methods, as well as methods to measure the total exposure and body burden of chemicals.
  (4) Development of a stronger base for risk assessment research.

(d) Expanded radiation-related research.
  (1) Studies of the dose-response relationship between (ionizing and nonionizing) radiation and disease.
  (2) Monitoring delivered dose of radiation for mammography throughout the country.
  (3) Study of effects of ultrasound on the fetus.
  (4) Development of methods to reduce delivered radiation dose from use of radioimaging drugs.
  (5) Development of patient selection criteria for appropriate use of diagnostic X-rays.
  (6) Development of closer links in radiation research done at HEW, Brookhaven and Oak Ridge.

(e) Expand training of personnel skilled for research and testing in environmental toxicology, emphasizing cross-training for persons already trained in related fields.

(f) Project grants to States and localities to strengthen their environmental testing and monitoring capabilities.

(g) Strengthened involvement of Health Systems Agencies in environmental toxicology.

(h) Short-term training for State personnel in epidemiology, toxicology and laboratory techniques.

(i) Demonstration projects to increase the involvement of Community Health Centers in issues related to environmental toxicology.

(j) Long-term prospective study of a large cohort of pregnant women and their children to detect substances with special toxicity to the fetus.

9. Occupational Health

Related to environmental toxicology, but somewhat broader and worthy of special focus, is the area of occupational health. The workplace is a special environment for the 90 million Americans in the labor force;

jobs are important contributors to human well-being, but potentially expose jobholders to adverse exposures to hazards. Often, the worker is placed in a cruel dilemma, accepting either risk or lower pay (or possibly no job at all), because of workplace hazards. The health consequences are serious to the individual and costly to society. Prevention is the strategy of choice, as workers' compensation, black lung benefits, health insurance premiums, and unpleasant health status statistics continually remind us.

NIOSH lists 1,500 substances that have shown some evidence of being associated with neoplasms. Other substances have a mutagenic or a teratogenic effect, or cause other diseases, such as respiratory ailments. Workplace accidents are still a serious problem with over $2 billion a year being spent on medical care and hospitalization through workers' compensation because of such injuries. Therefore, parallel with the regulatory function for which OSHA is responsible under the Occupational Safety and Health Act, NIOSH and the health agencies within HEW need to expand their functions with respect to occupational safety and health.

Occupational settings also offer unique opportunities for going beyond specific job-related protection to general wellness programs. The content of these programs can provide education to make personal lifestyle choices, and early detection of certain preventable risk factors of chronic disease, such as hypertension. Industry can be instrumental in fostering HMO development for workers, and also can use HMOs to provide a comprehensive range of occupational health services.

The proposed program would have the following health-related outcomes:

- Reduction in transient but immobilizing work-related injuries and absenteeism.
- Reduction in injuries resulting in permanent loss of function (e.g., vision, hearing, limb).
- Reduction in work-related cancer.
- Reduction in other work-related, chronic, degenerative diseases (e.g., heart disease, lung disease).
- Reduction in birth defects related to occupational hazards.

The proposed program contains the following elements:

(a) Expanded health information programs directed to the worksite.
    (1) Pilot projects for dissemination of health information in the worksite.
    (2) Special education programs to reduce exposure to occupational hazards, with particular focus on synergism with smoking hazards.
(b) Federal-State demonstration projects in a small number of States to identify and regularly examine workers at high risk of developing an occupational disease, conduct studies both in clinics and at industrial sites, provide public information, set up training programs for health professionals, and coordinate occupational safety and health with health delivery systems in the State.

(c) Within HEW, incorporation of occupational safety and health concerns into existing health delivery programs, such as HMOs, Maternity and Infant Care projects, Community Health Centers, Community Mental Health Centers, and programs involved in the prevention of mental retardation and congenital abnormalities.
  (1) Provide through these vehicles training and information to make organized delivery systems aware of occupational problems, including reproductive effects, how to question patients about occupational hazards, what conditions to screen for, and what advice to give to minimize future risk.
  (2) Increase recognition of occupational hazards to both men and women as a possible cause of mental retardation and congenital abnormalities, through work with agencies and organizations involved in prevention of these conditions.

(d) Development of health promotion programs in the worksite.

(e) Establishment of a national occupational safety and health data system to provide early warning of hazards, monitor workers in high-risk industries, and provide postemployment followup.

(f) Expansion of NIOSH Educational Resource Centers to provide an adequate supply of trained manpower.

(g) Negotiation with medical schools to stimulate training of physicians in occupational history taking and sensitivity to environmentally related illness in their patients.

(h) A study of feasible options to add incentives in workers' compensation for employers to prevent accidents.

10. Dental Disease

Dental disease prevention programs are strongly endorsed by most professionals, and are justified by dismal statistical measures of dental health. Dental disease affects almost the total population: 98 percent of the population have had tooth decay; 94 percent of 17-year-olds have had tooth decay, averaging 9 affected teeth; 65 percent of high school students have periodontal disease; 1 out of every 10 Americans have no teeth at all.

Because many dental diseases are not self-limiting, their consequences remain until treated. Yet, 47 percent of children have never been to a dentist for treatment, and 75 percent of the population do not receive complete dental care on a regular basis. Clearly, effective prevention of dental disease should be the strategy of choice, and effective means of preventing and controlling dental disease are widely known: proper use of fluoride; education in proper home care; early diagnoses and treatment; and restricting amount and intake of cariogenic foods.

The controversy about fluoride has been misplaced and unfortunate. The public has a right not to be denied access to a simple, direct preventive measure—fluoridated water supplies—or to alternative measures where central community or school water supplies do not exist.

The proposed program would have the following health-related outcomes:

- Reduction in the incidence of dental caries.
- Earlier detection and treatment of other oral diseases.
- Improved self-esteem associated with better appearance.

The recommended program contains the following elements:

(a) Promoting fluoridation of all community water supplies.

(b) Grants to States and cities for startup costs to install or improve fluoridation equipment, hire and train operators, monitor performance, and develop dental public health programs.

(c) Strengthened school programs in dental health, including both education and preventive services.

  (1) Weekly fluoride rinses in schools without a fluoridated water supply.

  (2) Periodic preventive dental screening and plaque removal for children.

  (3) Inclusion of dental education in comprehensive school health education curricula.

  (4) Linkage between Title V Maternal and Child Health funded dental programs and community schools.

(d) Consideration of the dental health data needed in a prevention data base.

(e) Expanded behavioral science research into the factors which are associated with health-related behavior and preventive service usage.

(f) National leadership to stimulate visibility and commitment to improved dental health.

11. Drug Abuse

Although data on the prevalence of drug abuse are often inexact, it is clear that habituating drug use is a widespread lifestyle choice with significant health implications. Use of illicit drugs is estimated to include, for example, half a million heroin addicts, 1 million "current" users of cocaine. The use of marihuana and cocaine in the 12–17 age group is growing at a rapid rate, and the factors and timing involved in initiating the use of these drugs are similar to those for smoking.

Prescription drugs are also a problem. According to recent interview data, 2.8 percent of youths (ages 12–17) and 4.4 percent of all adults (ages 18 and over) had ever taken prescription sedatives for nonmedical use, 3.3 percent of youth and 4.0 percent of adults had ever taken prescription tranquilizers for nonmedical use, and 4.4 percent of youth and 7.9 percent of adults had ever taken prescription stimulants for nonmedical use. These figures do not include the substantial numbers of such drugs which are theoretically used under medical supervision, but which are in fact abused. Overdoses of barbiturates—either accidental or intentional—are a leading cause of drug overdose fatalities. Tranquilizers are the most frequently prescribed drugs.

Prevention of drug abuse is difficult. Research is needed to gain better understanding of effective approaches. Education of target groups, the general public, and medical practitioners is an important activity. Decisions about many of the other personal behavior choices confronting youth—alcohol use, tobacco use, risk taking, etc.—influence choices to use or not to use drugs. A number of prevention models show merit, but require validation and replication.

The proposed program would have the following health-related outcomes:

- Reduction in deaths associated with drug overdose.
- Reduction in share of population suffering mental and physical illness related to drug use.
- Reduction in injuries from crimes of violence associated with drug use.

The recommented program contains the following elements:

(a) Inclusion of drug abuse prevention as a major component of a comprehensive school health education program.
(b) Public and physician education programs to reduce the number of sleeping pill prescriptions, emphasizing problems of cross-addiction (alcohol and sleeping pills).
(c) Education of providers (particularly pediatricians) on the taking of a drug history for adolescents and preadolescents.
(d) Promotion of involvement of national and local youth-serving agencies in drug abuse prevention.
(e) Encouragement of parent groups to provide supportive networks to resist drug abuse among youth.
(f) Strengthened drug abuse prevention research.
    (1) Validation and replication of effective drug abuse prevention strategies targeted to specific groups.
    (2) Demonstration programs on drug abuse prevention as a component of multiservice programs targeted to youth.
    (3) Demonstration programs directed at reducing unnecessary prescription of barbiturates and amphetamines by physicians.
    (4) Research to determine long-term effects of drug use on adolescents.

12. Sexually Transmitted Diseases (STDs)

STDs continue to be important communicable disease problems in the United States. Project grant programs are carried out by State and local health departments to reduce the spread of venereal disease (syphilis and gonorrhea). During fiscal year 1977, there were 21,536 reported cases of infectious syphilis and 1,002,806 reported cases of gonorrhea (gonorrhea cases are notoriously underreported).

STDs other than syphilis and gonorrhea are increasingly recognized as major public health problems. These STDs include trichomoniasis (3 million), nongonococcal urethritis (2.5 million), venereal warts and pubic lice (0.7 million), and genital herpes (0.3 million). The most important elements for a strategy to deal with STDs are: acquiring additional data on the extent of the problem; improving clinical services for STDs; providing better information to physicians and the public; and improving the tools for prevention, diagnosis and treatment. The capacity of the health departments to meet these needs should be increased, with assistance and support from the Federal level (research, technology transfer efforts, financial assistance, etc.).

The proposed program would have the following health-related outcomes:

- Earlier diagnosis of STDs with quicker treatment and interruption of disease transmission.
- Possible prevention of certain STDs through vaccine development.
- Reduction in the occurrence of pelvic inflammatory disease (and associated sterility) as a complication of gonorrhea in women.

The proposed program contains the following elements:

- (a) Improved STD information and education activities, in treatment settings and as a component of comprehensive school health education curricula.
- (b) Expanded support for various elements of STD research:
  - (1) A simpler and more reliable diagnostic test for gonorrhea.
  - (2) Gonorrhea vaccine research.
  - (3) An inexpensive and reliable diagnostic test for herpes and nongonococcal urethritis (NGU).
  - (4) Evaluation of antiviral compounds for use against herpes infections.
  - (5) Investigation of long-term sequelae of STDs such as herpes, mycoplasma, chlamydia—including perinatal mortality.
  - (6) Close coordination of CDC and NIH activities in both intramural and extramural programs.
- (c) Improvement in the data collection system for STDs.
  - (1) A statistical sampling system, with a benchmark surveillance pool of closely observed provider practices, may be much more reliable than the present mandatory reporting system.
  - (2) STDs to be observed should include gonorrhea, syphilis, NGU, herpes, trichomoniasis and any other STDs which become important.
  - (3) Disease classification codes (ICDA, NDTI, NAMCS) need revision.
- (d) Strengthened services delivery system.
  - (1) Standards should be developed for STD centers.
  - (2) Treatment guidelines need to be expanded, updated and disseminated.
  - (3) New approaches (e.g., peer counseling) are needed for special populations.
  - (4) Increased emphasis on STDs is needed in the training of professional personnel who deal with STD patients.

(e) Evaluation of effectiveness of current disease control programs.
    (1) Assessment of the effectiveness of contact tracing as a tool against diseases other than syphilis.
    (2) Evaluation of the effectiveness of the current use of public health advisors (PHAs)—perhaps by community "public health trials" monitoring (independently) changes in disease incidence as PHAs are removed from some areas and concentrated in others.

13. Hospital Infections

Large numbers of preventable hospital-acquired infections occur that result in much unnecessary morbidity and mortality as well as increased medical costs. Approximately 5 percent of the estimated 37 million short-term hospital admissions to civilian facilities developed one or more nosocomial infections in 1975. The incidence has not changed significantly in recent years, but the types of infections and the populations affected have varied. About one-third of all infections result from unsatisfactory hospital practices or techniques. The misuse of antibiotics by medical personnel further exacerbates the problem. Although a large proportion of the infections could be prevented, many individual hospitals have no incentive to take preventive measures.

All hospitalized persons are at some risk of acquiring a nosocomial infection. Selected groups at particularly high risk are those who are debilitated or immunosuppressed. The consequences of such infections include premature deaths, extended hospital stays, increased medical costs, permanent disabilities, repetitive or additional operations, loss of income and productivity, and the spread of resistant organisms in the community.

The problem is vulnerable to primary prevention through proper design and maintenance of hospital equipment; proper isolation and treatment of patients; selective antibiotic usage; and education and motivation of hospital personnel, including physicians, regarding appropriate hospital environments, techniques, and procedures. Secondary prevention, through development of a surveillance program for early detection of cases and new and unexpected problems, is also essential.

The proposed program would have the following health-related outcomes:

- Reduced incidence of hospital-acquired infections.
- Reduced morbidity and mortality associated with antibiotic-resistant organisms.
- Improved opportunity for benefits from hospitalization in vulnerable patient groups.

The proposed program contains the following elements:

(a) Ensuring that each hospital has at least one professional staff person responsible for concurrent surveillance of infection, appropriate investigation and control.
(b) Development of statewide programs for surveillance and special investigations, including routine hospital-based reporting systems.

(c) Development of a nationwide, comprehensive surveillance system to collect and analyze data on nosocomial infections.
(d) Improved training/motivation of physicians and hospital personnel regarding nosocomial infection techniques, procedures, and reporting.
(e) Revised and improved standard procedures for intrahospital surveillance and patient care.
(f) Expanded research to prevent and control nosocomial infections.
(g) Legislation on confidentiality to ensure complete reporting while maintaining a balance between liability and the public's right to access.

14. Accidents

While the single cause of accidents of greatest concern is the motor vehicle (and principal responsibility for issues relevant to motor vehicle safety lies outside HEW), there are many accidental injuries and deaths which occur in the home, in the workplace, and during recreation which are important detractors from the public's health. Indeed, the category "all other (than motor vehicle) accidents" ranks as the fourth leading cause of death in the country, and also the fourth leading cause of potential life-years lost.

Accidental injury is a major health problem of the young. Accidents in home and recreational settings are important sources of injury, and the young in poverty groups are especially vulnerable. Education of parents to avoid hazards and to be aware of risks is important. Protective environmental change is often extremely effective—for example, window guards to prevent falls in urban areas, and child-proof caps on aspirin bottles to prevent poisoning, have proven efficacy.

Safety in the workplace is an important part of industrial hygiene. The occupational environment offers multiple opportunities for traumatic injuries from equipment, flying objects, falls, etc. Yet, careful safety engineering, protective devices, and education of the worker in hazard avoidance, can significantly reduce these opportunities. Industrial hygiene services, provided by the employer or by HMOs, is a key element of occupational safety and health.

The proposed program would have the following health-related outcomes:

- Increased employee productivity with reduced absenteeism due to injury.
- Fewer injuries resulting in permanent loss of function.
- Reduction in deaths caused by accidents.

The proposed program contains the following elements:

(a) An intelligence and reporting network with continuous surveillance of accidental injuries and deaths.
(b) Development of a methodology and guidelines for reduction of trauma from prominent accidental injuries.
(c) Identification of environmental and product changes to reduce injuries, and development of guidelines to implement changes.

(d) Development of a State-based injury control program directed at home and recreational accidents with phased-in project grant support.

(e) Establishment of occupational safety and health services in qualified HMOs.

(f) A program to reduce casualties experienced by young people under the influence of alcohol and/or drugs.

(g) Negotiation with the Department of Labor on a joint study of feasible workers' compensation incentives for employers to be more concerned about accident prevention.

(h) Work with the Consumer Product Safety Commission, the Occupational Safety and Health Administration, the Fire Research Center at the Department of Commerce, and the Department of Agriculture in implementing this program.

15. Mental Health

The President's Commission on Mental Health (PCMH) reports that 3 percent of the American population (6.7 million people) sought treatment from the specialized mental health sector in 1975, and that 1.5 million persons were hospitalized in 1975 for mental problems. In 1974, 5 percent of persons with activity limitation reported mental and nervous conditions as the cause. The PCMH also notes that, at any given time, up to 25 percent of the population is estimated to suffer from mild to moderate depression, anxiety, or other emotional disorders.

In reviewing the state of prevention activities in mental health, the PCMH noted a number of promising opportunities, including those pertaining to the selective provision of support services at the time of critical life events to reduce the potential of those events to contribute to mental illness. To strengthen the national effort in prevention of mental illness, the PCMH recommended the establishment of a Center for Prevention within the National Institute of Mental Health, with a focus on primary prevention. The proposed Center was recommended to have "a funding level of no less than 10 percent of the NIMH budget within 10 years, to support epidemiological, biomedical, behavioral, and clinical research aimed at prevention * * * including those related to community support systems."

The proposed program would have the following health-related outcomes:

- Reduction in the incidence of mental illness.
- Reduction in deaths due to suicide.
- Improvement in general emotional well-being.
- Reduction in child abuse.

The proposed program contains the following elements:

(a) Establishment of a framework (possibly a Center) within the National Institute of Mental Health, with responsibility for stimulating research and disseminating information related to prevention.

(b) Expanded support for demonstration projects for State and local primary prevention programs in mental health.

(c) Strengthened linkages between State social service agencies and mental health agencies.

(d) Sensitizing health and social service workers to be alert for emotional crisis periods, such as those related to the postpartum period, marital separation and divorce, death in the family, disasters, hospitalization of children, and emotional disturbance in a family member.

(e) Expanded epidemiological, biomedical, behavioral and clinical research into the problems presented by these events.

(f) Systematic means of ascertaining incidence and changes in mental and emotional disorders through use of standardized instruments.

(g) Training of additional professionals, paraprofessionals, and social service workers in primary prevention of mental health problems.

B. STRATEGY ELEMENTS

1. Delivery of Personal Preventive Health Services

a. Federal Reimbursement for Individual Preventive Services

A national health insurance program should ultimately provide preventive services. The specification of these services ought to be a priority of the Department. The list developed as a followup to the Institute of Medicine Conference must be refined, careful actuarial estimates determined, and implementation problems assessed. An intradepartmental working group should be established to provide recommendations on personal preventive health services to be provided under Medicare and Medicaid.

b. Delivery of Preventive Service Modules in Group Health Care Settings

The preventive services component of care delivered in federally fostered organized health care settings must be strengthened. To expedite delivery of preventive health services, a separately funded preventive services module should be offered at full subsidy to Community and Migrant Health Centers, and at a matching rate to HMOs and State or local health centers.

c. Problem-Specific Direct Service Delivery Programs

Special programs should be established to foster the delivery of preventive services of particularly high priority. Examples include hypertension, immunization, genetic diseases screening, and school-based dental services. These services are discussed in the next section on capacity building.

2. Strengthening Non-Federal Sector Capabilities

a. State, County, and Municipal Agencies

A vigorous program is needed to strengthen the capabilities of the State and local health and education agencies to enhance their activities in health promotion, health protection, and the delivery of personal preventive health services. This program should include:

(1) Formula grants to States for carefully targeted health promotion activities; or project grants for State and local programs in smoking and health, physical fitness, nutrition and nutrition surveillance, alcohol abuse, injury control, and school health education.

(2) Small seed grant funds should be made available for particularly innovative community-based health promotion programs.

(3) Increases should be provided to State and local project grant programs in hypertension, occupational and environmental health, fluoridation, and sexually transmitted diseases.

(4) New project grant programs should be implemented for State and local service activities in genetic diseases screening and school-based children's dental health.

(5) Short-term training should be provided for State personnel in epidemiology, toxicology, and laboratory techniques.

b. Health Planning Agencies

Assistance should be given (one qualified person per HSA) to the Health Systems Agencies to improve their capability to analyze local data to identify preventable morbidity and mortality.

c. Health Maintenance Organizations

HMOs provide a unique setting in which to offer preventive services. Grants should be made available to allow the development in HMOs of such innovative activities, including those related to wellness programs and to occupational safety and health.

d. Linkage Between Health Agencies

Facilitation of access to preventive services by certain key target groups will require a better referral linkage capacity between different health agencies dealing with special problems. A project is needed to develop a mechanism for improved referral linkage capacity, including the development of epidemiologic criteria for referral.

e. Linkage Between Health Agencies and Social Service Agencies

Similarly, a mechanism must be developed to facilitate referral between social service and health agencies for provision of preventive services.

f. Linkage Between Health Agencies and Education Agencies

The schools are key to the delivery of health information and education important to prevention. Close ties must be developed between State health and education agencies, and funds provided to State education agencies for the development of innovative school health education programs.

3. Determination and Enforcement of Health and Safety Standards

a. Nutrition

Changes are recommended in FDA's discretionary authority for both food labeling and food content.

(1) The Department should work to strengthen and improve its food labeling regulations. Discretionary labeling authority should be sought to require mandatory labeling with respect to salt content, total sugar content, fat sources and content, and calories. Labels should be displayed in a manner that is comprehensible to the buyer. Work ought also to be undertaken with the FTC to promote more informative advertising for food products.

(2) Discretionary content authority should be sought to regulate the nutritional quality of imitation or substitute foods which lack vital nutrients, but are similar in appearance and use to important existing foods.

b. Alcohol

Changes recommended regarding the labeling of alcoholic beverages, as well as products containing alcohol would:

(1) Require labeling of alcoholic beverages, including ingredient labeling, dependence warning labels, warning against operating automobiles or other machinery, and health hazard warnings for women during pregnancy. Transfer of authority for such labeling to FDA from the Bureau of Alcohol, Tobacco and Firearms (Treasury) should be considered.

(2) Require warning labels on oral drug products containing alcohol (vitamin tonics, decongestant products).

c. Environmental and Occupational Health

Expanded research efforts are needed to strengthen the work of the regulatory agencies (see "knowledge development" below). In addition, a mechanism should be developed to provide HEW participation in the health-related decisions of the regulatory agencies (see "Prevention Roundtable" below).

4. Manpower Development

a. New Manpower

The Department should provide training grants to supplement certain categories of manpower to strengthen the capability of prevention programs. These include environmental toxicologists, epidemiologists, occupational safety and health specialists, public health nutritionists, nurse practitioners, and health service administrators. With regard to environmental toxicologists (and some of the others), the training programs ought to emphasize the development of the expertise through cross-training of people in disciplines other than their primary discipline (e.g., microbiology or analytic chemistry).

b. New Curricular/Training Emphasis

Grants and contracts should be provided to stimulate an expanded role for prevention in the training of professionals and paraprofessionals—particularly for environmental and occupational health.

c. Manpower Monitoring

A detailed inventory is needed of prevention manpower pools, and a system established to reliably predict needs as demands in disease prevention and health promotion change.

5. Provision of Economic Incentives

Responsibility for most economic incentives lies outside HEW (and is discussed below under "leadership"), but certain activities deserve note.

a. Child Health Assurance Program

A reward system should be considered for CHAP programs which promote preventive services by exceeding their targets.

b. Health Maintenance Organizations

Financial incentives should be provided to HMOs to expand preventive services beyond the mandated minimums.

6. Provision of Leadership and Coordination

a. Surgeon General's Report on Prevention

A Surgeon General's Report would help build understanding of prevention goals among the public, the medical community, and decisionmakers, and would provide information to all concerned citizens, institutions, and agencies about effective methods to realize these goals.

b. Prevention Roundtable

A Federal Prevention Roundtable, cochaired by the Surgeon General and the Domestic Policy Staff, should be established to provide a regular forum for discussion of interagency interests in disease prevention and health promotion. Perhaps in conjunction with the work of this Roundtable, a mechanism can be developed to facilitate HEW participation in the health-related decisions of other government agencies, particularly the regulatory agencies.

c. National Health Promotion Program

A major national campaign should be initiated to provide the public with perspective about key behavioral variables in morbidity and mortality. The focus should be on measures which can be employed in each of the important settings identified (school, workplace, home, community, medical care delivery) to promote health. Grants should be provided to stimulate the development of innovative activities in these settings.

d. National Health Information Clearinghouse

The clearinghouse mandated by P.L. 94–317 should be established as a "switching center" to facilitate the public's access to information developed and disseminated within HEW, and to develop a mechanism to evaluate that information and test its effectiveness. In areas where information is inadequate, or for those settings for which there is not appropriate information, the Department should stimulate the development of the necessary materials.

e. Example

HEW should encourage each agency to adopt an employee program geared to disease prevention and health promotion, including components designed to provide nutritious cafeteria fare and to enforce indoor clean-air standards.

f. Work Within HEW

The Center for Disease Control ought to be established as the lead departmental prevention agency. In addition, a strong coordinative focus should be established in the Office of the Assistant Secretary for Health. Coordinative foci for disease prevention and health promotion ought also to be identified in OE, OHDS, HCFA, ADAMHA, HRA, HSA, and NIH. (FDA is essentially a health protection and promotion agency.)

g. Work With Other Agencies

The Department should work closely with other Departments to encourage: careful perusal by the Federal Trade Commission of advertising practices, particularly with regard to cigarettes, alcohol, and food; the development of tax policies which encourage the initiation of employee health promotion and protection programs, while discouraging the consumption of harmful products like cigarettes; the development of employee fitness programs; the adoption of policies maximizing highway safety; establishment and enforcement of appropriate health protection standards by regulatory agencies. The Roundtable noted above may provide the vehicle for this work.

h. Work With Private Industry

Where possible, the Department should work with private industry to encourage responsible advertising and the development of safer products.

i. Information Campaigns

The Department should increase its efforts to develop carefully designed and tested health promotion programs using television and radio. Special emphasis ought to be given to smoking, nutrition, alcohol abuse, drug abuse, exercise, hypertension, and childhood immunization. These programs ought to provide useful suggestions on intervention measures—not mere admonitions on smoking, overeating, drinking, etc.

7. Expansion of the Knowledge Base

a. Cross-Cutting Options

Expansion of research activities in several areas ought to be undertaken to provide information useful in addressing a number of problems in prevention.

(1) Community-based risk factor intervention demonstration programs.
(2) Studies of the childhood determinants of behavior related to health habits.
(3) Evaluation of health education and health promotion techniques.
(4) Studies on behavior related to the use of medication.
(5) Studies on the use of health hazard appraisal instruments.
(6) Long-term prospective population-based community epidemiologic studies monitoring health behavior, risk factors and relations to morbidity and mortality.
(7) Followup studies of participants in previous NCHS health surveys to measure survival, subsequent morbidity and use of health services.
(8) National occupational safety and health data system to provide early warning of hazards, monitor workers in high-risk industries, and provide postemployment followup.
(9) Benefit/cost analyses of prevention activities.
(10) Plan for long-term prospective study of a large cohort of pregnant women and their children to identify risk factors in pregnancy.
(11) Epidemiologists and preventive medicine specialists should be added to the membership of appropriate NIH Advisory Councils and study sections.

b. Problem-Specific Options

Details on research related to the subject areas listed in "a." above are provided in the discussions of each of those subjects.

C. CONCLUSION

The range of activities reviewed in this report is tremendously broad and will require substantial resources, but the importance of supporting stronger efforts in disease prevention and health promotion cannot be underplayed. Chronic diseases, which drain so many of the Nation's health care dollars, need not be inevitable consequences of the aging process. Disease treatment has provided the major focus for the activity of both the public and private health establishment, at tremendous cost and with surprisingly little gain in the public's health. Substantial uncertainties exist on ways to prevent disease, but more is being learned daily. The Prevention Task Force has recommended the actions it considers most important to strengthen the national prevention effort. Implementation of these measures of course depends on availability of funds, but vigorous national commitment to disease prevention and health promotion is needed to ensure that Americans will be a truly healthy people.

APPENDIXES

The appendixes to the report of the Departmental Task Force on Disease Prevention and Health Promotion have not been included in the Background Paper. The topics of the papers in those appendixes are noted below, and copies may be obtained by writing directly to the Office of Disease Prevention and Health Promotion in the Department of Health, Education, and Welfare.

Appendix No.	Topic
1	Preventive Services for the Well Population—22 pp. (Report of the Institute of Medicine.)
2	Alternative Packages of Lifetime Preventive Services—9 pp. (Synopsis of the various reports.)
3	Preventive Services Module for Organized Primary Care Services—4 pp. (Report of the Services Work Group.)
4	Prevention for the Aged—4 pp. (Statement of the National Institute on Aging.)
5	Preventive Health and the Environmental Sciences—9 pp. (Introduction of Interagency Regulatory Liaison Group Report.)
6	Strategies for Action in Research and Health Information—55 pp. (Selected Detailed Work Group Papers.)
7	HEW Prevention Inventories—87 pp. (Inventory of HEW Programs Related to Lifestyle, the Environment, and Preventive Services.)
8	Prevention Legislative Authority—7 pp.
9	Federal Prevention Activities Outside HEW—80 pp. (Report from the University of California Health Policy Program.)
10	Conference Report on Disease Prevention and Health Promotion—32 pp. (Institute of Medicine.)

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